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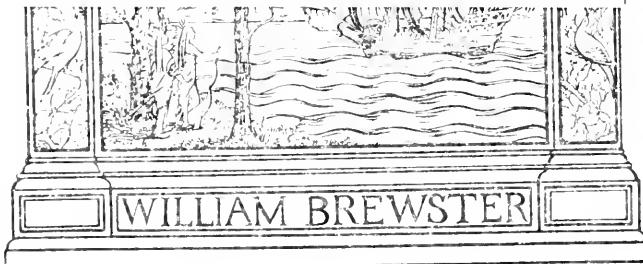
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THE MUSEUM.

1895

A M EDDY PRINTER

ALBION N Y

VOL. I.

1894-5.

THE MUSEUM.

A Journal Devoted to Research in Natural Science.



Rates: \$1.00 per year in advance, to all countries. Single numbers, 10 cents.

Published the 15th of each month by
WALTER F. WEBB, ALBION, N. Y.

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VOL. I.

NO. 1

NOVEMBER, 1894.

THE MUSEUM.

A Journal Devoted Exclusively to Research in
Natural Science.

RATES:—\$1.00 per year to all countries, in advance. Single numbers, 10 cts.

Published the Fifteenth of Each Month by
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Manx Shearwater	1.00	Ruby-throated Hummer	55	White-eyed Vireo	.15
Leach's Petrel	.20	Nests of Hummer, asstd	45	Bell's Vireo	.45
Gannet	.35	Seis-tail Flycatcher	40	Prothonotary Warbler	.25
Cormorant	.30	Kingbird	65	Golden-winged Warbler	.75
Farralione Cormorant	.40	Crested Flycatcher	40	Parad. Warbler	.20
White Pelican	.35	Mex. crested Flycatcher	33	Myrtle Warbler	.55
Brown Pelican	.25	Phoebe	65	Magnolia Warbler	.70
Blue wing Teal	.20	Wood Pewee	65	Blk-throated Grn Warbler	.50
Barrows Goldeneye	.75	Acadian Flycatcher	45	Pine Warbler	.50
Whooping Swan	1.50	Western Flycatcher	15	Prairie Warbler	.10
Amer. Flamingo	1.00	Little Flycatcher	25	Ovenbird	.20
White Ibis	.35	Trails Flycatcher	15	Louisiana Water-Turdus	.50
White face Glossy Ibis	1.00	Least Flycatcher	40	Maryland Yellow-throat	.12
Wood Ibis	.35	Skylark	15	Yellow-breasted Chat	.08
Amer. Bittern	1.00	Prairie Horned Lark	15	Hooded Warbler	.50
Least Bittern	.75	Amer. Magpie	65	American Redstart	.65
Amer. Egret	.20	Blue Jay	66	White Wagtail	.10
Snowy Heron	.15	Amer. Crow	35	Meadow Pipit	.10
Louisiana Heron	.12	Fish Crow	40	Sage Thrasher	.50
Little Blue Heron	.12	Starling	25	Mockingbird	.65
Green Heron	.12	Bobolink	03	Catbird	.02
Blk. crown. N. Heron	.12	Cowbird	10	Brown Thrasher	.65
King Rail	.20	Dwarf Cowbird	63	Senetti's Thrasher	.15
Sora Rail	.12	Yellow-headed Blackbird	03	Chrysolophid Thrasher	.15
Virginia Rail	.12	Red-wing Blackbird	40	California Thrasher	.20
Corn Crake	.20	Bicolored Blackbird	10	Penins. Thrasher	.75
Florida Gallinule	.10	Tricolored Blackbird	10	C. Or. Wren	.12
Amer. Coot	.09	Brewer's Blackbird	05	Rock Wren	.50
Egg. Snipe	.25	Purple Grackle	45	Carolina Wren	.10
Dunlin	.35	Great-tail Grackle	05	Louinita Wren	.55
Violet	.10	Bronzed Grackle	03	Bewick's Wren	.5
Brvt. Sandpiper	.30	House Finch	05	Baird's Wren	.25
Spotted Sandpiper	.15	American Goldfinch	10	House Wren	.05
Lapwing	.15	Arkansas Goldfinch	10	Long-billed Marsh Wren	.12
Oystercatcher	.25	Chi-stri-collared Longspur	35	White-breasted Nuthatch	.25
Bobwhite	.15	Vesper Sparrow	20	Brown-headed Nuthatch	.25
Texan Bobwhite	.10	Grasshopper Sparrow	65	Tufted Titmouse	.35
Fly. Pohwhite	.10	Look Sparrow	03	Chickadee	.12
Calif. Partridge	.15	Western Lark Sparrow	02	Carolina Chickadee	.15
Prarie Hen	.20	Chipping Sparrow	03	Wren-Tit	.50
Sage Grouse	.75	Field Sparrow	02	Bushtit	.25
Chachalaca	.60	Song Sparrow	25	Blue-gray Gnatcatcher	.30
Red-coll. Phoebe	.75	Mountain Song Sparrow	10	Wood Thrush	.65
White-wing Dove	.20	Heermann's Song Sparrow	65	Wilson's Thrush	.12
Mex. Ground Dove	.10	Samuel's Song Sparrow	50	Russet-backed Thrush	.15
Mourning Dove	.05	Texas Sparrow	10	Hermit Thrush	.10
Turkey Vulture	.75	Towhee	20	American Robin	.03
Black Vulture	.75	Spurred Towhee	10	Western Robin	.10
Cooper's Hawk	.50	California Towhee	10	Wheatear	.40
Red tail Hawk	.50	Cordinal	15	Bluebird	.02
Gray Sea Eagle	2.00	Rose-breasted Grosbeak	10	Western Bluebird	.12
Merlin	.30	Blue-g. breasted Grosbeak	15	Indigo Bunting	.08
Kestrel	.25	Indigo Bunting	15		

WALTER F. WEBB, ALBION, N. Y.

THE MUSEUM.

A Monthly Magazine Devoted to Research in Natural Science.

VOL. I.

ALBION, N. Y., NOVEMBER 15, 1894.

No. 1

An Old Timer's Greeting.

It has been a number of years since I have taken the privilege of the columns of our special journals, and I wonder how many of my old friends I will greet through the medium of THE MUSEUM. To such I would say that although time has wrought some changes with the members of the Bristol Ornithological Club and many are in distant lands, yet some few friends including the writer have renewed each season our companionship with our local bird life.

The well-known colony of Ospreys around Palmer's river, hold their own in numbers; a visit during the second week in May, 1894, giving a count of eighty-three occupied nests, one of which was erected on the top of a telegraph pole, along the side of a railroad. The smoke from every passing engine ascended around the structure, but the birds have each year built a new nest to replace the destruction of the line-men.

Red-shouldered Hawks are a very common bird in our Bristol county woods; much more so than one would suppose possible in thickly settled communities. Many of these birds are familiar friends, and their nesting has been noted in previous accounts. By April 12th, 1892, the "Cobble-hill" pair had laid a set of five eggs, which is an unusually large number and worthy of special mention. In previous years the usual clutch had been three. The "Goff's Woods" and "Reservoir"

pair were visited on April 20th, 1894, and the sets of three eggs each taken. Both of these pairs were first robbed in 1882, and every season since they have not failed to present us with a fine clutch. They have persistently nested in the same locality, not resorting to alternate situations as other pairs have done.

A freshly laid set of six Marsh Hawk's eggs were taken on May 7th, 1892, which is the earliest date I have ever taken any eggs of this bird. In the immediate locality another set of four fresh eggs were taken on May 29th, although both pairs of birds were in evidence on the first named date.

The Sharp-shinned Hawks, eluded my limited search for them this year, but very handsome sets were taken for the three previous years. One set of eggs taken May 19th, '92 were extremely beautiful. This pair immediately built a new nest, in a grove near by and another set was ready on June 7th. All nests of this Hawk have been placed in rather small pines in quiet open groves.

Some quite rare birds have been found nesting during late years. A nest and five eggs of the Nashville Warbler were taken on June 2d, 1892. The nest was sunk flush with the ground on a rather steep side hill in open sproutland and incubation had scarce begun. A nest of the Solitary Vireo with four eggs showing heavy incubation was found on May 30th of the current year. They differ greatly in nidification from the other New Eng-

land Vireos. They have the usual pen-sile nest, but in my experience placed on some dead dry limb, not at all screened by leaves, as the Red-eye and Warbling Vireos usually are. One found June 7th, 1885 and noted in Bulletin No. 2 of B. O. C. was placed on a dead limb of a pine, and very stationary.

The Black and White Warbler, while an extremely common bird of our woods, is seldom flushed from her nest. One was discovered quite by accident, on June 3d, '94, while walking through a rather wet swamp, a locality in which I did not expect to find any ground breeders. The nest was placed on a "hummock" at the base of a maple and partly covered by a root that branched off from the trunk some few inches above the ground. The eggs were five in number of a very clear transparent white with a circle of fine amber spots around the crown. In every other instances in which I have noted the nidification of this bird, the nest has been placed on a rather dry slope free from moisture.

The Indigo, Rose-breasted Grosbeak, Crested Flycatcher and Yellow-breasted Chat, are very rare local birds, and their nesting is an occurrence of interest.

The quite famous colony of Parula's in the large moss covered orchards of Rockyhill are still in evidence. They have been visited by nearly every collector in this part of New England, and eggs from this locality must be in many collections. They have not been disturbed much during the past few years and their numbers are greatly on the increase. It is seldom that a globular nest of these birds are found.

They generally work out a cup shaped cavity in a bunch of moss which renders their homes much less conspicuous, and it is often that one is obliged to give the limbs of the tree several smart raps, to ascertain if it is inhabited by these dainty little warblers.

In a rather active collecting experience now extending back for fifteen years I have never found but a single set of eggs of the Cat-bird numbering more than four, and that was a set noted on May 28th, '94. I would be pleased to learn how great a rate such a sized set, is to the more common compliment of three or four. In this connection I would state that I always look into every Robin's nest for the chance of a possible set of five to record, but it seems as if I should have plenty of opportunities and time to keep on looking.

F. H. C.,
Bristol Co., Mass.

Nesting of the Whip-poor-will.

There are, comparatively, very few of the horde of collectors in the Union who have taken the eggs of this bird, and the description of the breeding habits are rare. The price of eggs has remained quite high and even in these days of hard times when prices drop on nearly all things, Whip-poor-will eggs maintain their prestige. Every year ignorant buyers and sellers traffic in Nighthawk's eggs and think in all sincerity that they are Whippoorwill's. I do not doubt that there are hundreds of the impositions in the collections of the younger oologists. And, too, there are many collectors who do not know the difference between the two birds, and only have a vague notion that

there are distinguishing points. With the prospect of giving offense to advanced collectors by occupying your space, I will beg pardon and point out two characteristic marks by which the two species may be identified.

In the Whippoorwill we find a row of long stiff bristles growing from the edges of the upper mandible. The Nighthawk has no bristles or hairs growing from its mouth, but has an identifying mark in the shape of a white stripe or spot on the underside of the wing. This mark can be seen when the bird is flying. But in spite of the difference in the two birds, so often confounded, many agriculturalists will assure you that the two species are one and the same bird.

This mysterious crepuscular species arrives in Southern Michigan about April 20th. It is occasionally seen by the middle of the month, but oftener is not observed until after May first. Carefully concealed in the thick, little frequented forests, the Whip-poor-will is often overlooked during the first two weeks of its stay, for it is only after the birds have arrived in numbers and begin to sing at twilight that their presence is noted by the average observer. If the weather remains chilly in early

May these night-singers are sometimes not heard till the tenth of the month.

In the latter part of May, sometimes in early June the eggs are laid. One instance is brought to my recollection where the eggs were found on May 17th, but this was remarkably early and unusual. I have found three complete sets of eggs in as many counties in this state, and one egg at another time, and also the young birds in two instances.

There are very few, if any species of bird who make as little preparation for the eggs as the subject of this sketch. A nesting site is selected, usually among the bushes in a forest, the old bird deposits the two eggs side by side in a little hollow. Always in my experience, the ground was covered with a carpeting of dead leaves of the previous season, and the slight hollow was therefore ready lined. Someone has said that the birds scratched the hollow for the eggs, but this is probably not the case. From careful observations of the hollow and the immediate surroundings, I am satisfied that not a leaf is disturbed.

The following cut gives an accurate view of one nest and two eggs.



Three of the nesting sites that I have found were in high oak woods, two were in a lower locality and not far removed from water, and in a mixed woods of hawthorn, dogwood, basswood, elm and some ash and beech, and one was in a beech and maple forest. The eggs were always in a slight hollow and rested on a bed of dry leaves. In one instance the eggs touched a small dead limb which bound one side of the hollow, and rested with their ends against this unusual boundary. In every case the site was quite near to, or beneath a thicket of bushes or small trees. Without exception, the neighborhood of the location was well grown up with thick underbrush.

All of my eggs were discovered from the old bird flushing as I passed near. This is the usual experience of collectors, and it is a remarkable find if one runs across the eggs without the aid of the setting bird. In fact, it is surprising to secure the eggs by any means, when the nesting site is sought. My finds have always been accidental and entirely unexpected, while repeated trials at nest finding have invariably resulted in failure. My first set of eggs was found thirty years ago, and not another nest was discovered until ten years later. Another set slightly incubated was taken May 25, 1884. Other sets taken by friends of mine were as follows: Fresh set May 28, '76; May 22 and 28, '77 and May 21, '79. All in the southern part of the lower peninsula.

The old bird generally rises when the stroller is very near, and with a few flops settles at a little distance, where she looks at one with big star-

ing eyes. If again flushed, she circles about the collector. At one time a friend found a set of eggs, we watched the old bird with interest, as she gave evidence of great concern, although the eggs were fresh. After flushing she flew about five or six yards, and alighting, eyed us. We flushed her again, when she uttered a peculiar pathetic note, not unlike the note of the old hen Partridge when she tries to lure an interloper from her brood, but not as loud. When the young birds are found the old bird flops about much like the nesting Woodcock and the male bird sometimes lends his presence, when both circle about their young, or perch on low limbs or logs near and stare at the intruders.

The eggs are among the most beautiful of American bird's eggs and always commands admiration. Of crystal white they are spotted and dotted with at least two colors or shades, and sometimes with three or four. Often the markings are about evenly distributed over nearly the entire surface, and when of this pattern, the colors are generally shown in formless blotches. These blotches have the appearance of showing through an external coat, as if obscured with a very thin covering of varnish. The surface, shining and bright, yet showing beneath, the obscured modest coloration of lavender or lilac tints. Again the eggs are marked with smaller spots of two or three shades of the above colors, and these dots and spots are plainer than the obscured markings, and are quite often placed in the form of a ring nearer one end. Occasionally the coloring of the markings is of a yellowish-brown. The eggs are always nearly

elliptical and often, apparently, exactly so.

Many writers have said that this species, when disturbed in nesting, will remove to another quarter by transporting the eggs to a new site. It is claimed that the bird carries the eggs in her mouth and some writers even assert that the young are removed by this means. The Chuck-will's-widow and Nighthawk are also credited with this strange, but convenient habit. I have yet to learn anything of this nature from my own observation, and must say that we should not accept the theory until positively shown that such is the case. There is no doubt that the members of this family are fully capable of carrying an egg in their cavernous mouth, but does it follow that we are to believe a tale of this nature because of the capacity of the birds to accomplish the act.

Long before Columbus discovered America; yes, we may say, before the commencement of the Christian Era, representatives of this family were called goat-suckers, because of the ignorant belief that these birds were in the habit of sucking goats. It would be impossible to approximate the number of centuries in which this fabulous story has been credited, and to this day persons are found who thoroughly believe it, as well as other equally unreliable yarns. Most of my readers have met men who claimed to have seen porcupines throw their quills. And the strangest part is that the story is sincerely believed by the recounters who, probably, from telling it so frequently, have come to believe in its truth. As Shakespeare says:

"Like one,
Who having, unto truth, by telling of it,
Made such a sinner of his memory,
To credit his own lie."

Has anyone ever seen a Nighthawk, Whip-poor-will or any other representative of this family seize an egg or young one in its mouth and fly away with it? There is chance for investigation here, and if someone will describe the *modus operandi* of so-called goat-suckers transporting their eggs or young, and send in the account they will be filling a long felt want, and will settle a disputed point.

This criticism is not made to stimulate discussion, or in the nature of affrontary, but rather as a mild hint to collectors, and particularly observers who are desirous of publishing their notes, to

"Be sure you are right, then go ahead."

After moulting the Whip-poor-will again tunes up his peculiar, loud, sounding jargon, and may be heard pleasant evenings even as late as September 20th. This species arrives, on the average a fortnight earlier than the Nighthawk and remains with us quite three weeks later.

Labrador Notes.

W. A. STEARNS.

Very few persons are acquainted intimately with the region known on your maps as Labrador. Until recently, or within recent years, only, has our knowledge of this vast peninsula, jutting out into the Atlantic ocean in the North and extreme East of our continent, broadened into something definite.

Labrador,—*La Bras d'Or* of the French, or "The Arm of Gold." This is one of its derivations. There is a

popular tradition that a sailor by that name (Labrador) did discover the region and thus, eventually, named it. It was probably really discovered by Basque fishermen. Look in your encyclopedias and see who the Basque were.

Labrador is no part of Canada, as many suppose. Most of the people who say they have been to Labrador have never been there at all. In common parlance, Labrador is *all* the region East of the Saguenay River, along the North shore of the St. Lawrence River. Really it does not begin until we are nearly half way through the Straights of Belle Isle, and at a place called Blanc Sablon: This little fishing village is the dividing line between Canada and Labrador, the real Labrador I mean; and the real Labrador, a region of rocks, scant vegetation, sea washed shores, and few natural attractions. Such has been *supposed* to be the case, until within recent years.

Lately, within twenty years, a good many people have visited this locality. It has rock-bound coasts in reality: Yet it also has green fields and sunny hillsides; fine rivers, lakes, waterfalls, and mountain scenery. It is a game-abounding country; and the deer herd in the interior in large bands. The black bear is not infrequent. Many smaller wild and game animals abound. Fur-bearing animals are plenty in winter, seals are in its waters, ducks and geese and an infinite quantity of shore and game birds are common, and trout, salmon and codfish can be obtained fresh from the water or the nets almost literally at a moment's warning. These are a few of the attractions of Labrador.

Then we have icebergs: Immense fellows, some of them larger than any block of houses or stores in New York. You can feel their icy breath when a mile away from them. They sail majestically along and ground. Then the weather begins to be warm and they go to pieces with a noise like thunder, and scatter into a thousand fragments.

In winter Labrador is cold. It snows, it freezes, and the thermometer goes down from 10 to 40 degrees below zero nearly every night during the cold weather.

People travel by boats in summer, and dog sleds in winter. The dogs are harnessed, the rider sits on the sled and controls them with a whip and without any reins. This whip has a handle about a foot long and a lash about sixty to one hundred feet. It takes a great deal of experience to crack this whip; it will more often fly back into your face if you do not know how to handle it. A driver of experience has been known to cut a gash in a man's boot sixty feet away and not hurt any part of the man.

Why do visitors go to Labrador? Besides all the attractions I have mentioned, the air, when it is not foggy, is about as perfect as is to be found anywhere on the globe. Clear, crispy, and invigorating, it surprises you into forgetfulness of aught but the passing moment. You forget the humdrum and cares of life. You are inspired with new thoughts, new emotions, and return to your home with new vigor to pursue your daily tasks once more.

Forget the fogs, the black flies and the mosquitoes, these are the bad points of the place, and you always remember Labrador with intense interest. .

Doubtless two of the most interesting birds on the whole Labrador coast and that afford the greatest opportunity of study are the Auks and Puffins. Most collectors are more or less familiar with the eggs, which are very pretty and show really wonderful diversity of color, but a great many probably are not familiar with the breeding habit of the species, except in a vague manner. I will here give descriptions of the two species taken from my "Bird Notes in Labrador."

RAZOR-BILLED AUK: TINKER TURRE.

Utramania torda. — L. Leach.

Regarding this and the succeeding characteristic birds of Labrador a book could be well written, but we must pass them by with notices merely brief but to the point. With regard to the Razor-billed Auk, the "Tinker" or "Turre" as it is often called, I have noticed them breeding at the Fox Islands, off Kekarp-wei River, in almost as large colonies as the "Parakeets" off Parakeet or Greenly Island. I noticed them, also, in thousands about several other small islands, and found that this species was always very abundant about this locality while much rarer and replaced by the Foolish Guillmot or "Murre" farther northward. Here they breed in the crevices of the rocks, long, deep, and narrow clefts being sought. I did not find but a single egg in a nest but was repeatedly told by the inhabitants that, if I took the eggs, the birds "will lay again another day." The people here systematically take all the eggs they can find regularly twice a week throughout the breeding season, and find the birds so wonderfully accommodating that the last batch taken is near-

ly as numerous as the first. The "Turres" associate with both the "Murre" and the Black Guillemots. The egg of the latter bird, though smaller and otherwise distinct, is not unsimilar in appearance, and often the two are found breeding side by side, though seldom ever in any great numbers. The Razor-billed Auks are among the first birds to be seen on approaching the Labrador coast. We found them much more abundant in Southern than in Northern Labrador. With both the Razor-billed Auk and the Foolish Guillmot considerable similarity of habits appear to exist; possibly this results from the fact that both species are so numerous that the chances of individualizing them is reduced to the shape of the bill as seen at short range only, but regarding the flight and habits of the two I know of no one who has satisfactorily, to me at least, distinguished between them. We saw thousands of both species; they passed and repassed us so rapidly and so thoroughly bewildered us, as they seemed to be bewildered themselves, that I could not tell surely in describing either species whether the remark applied equally to both or exclusively to one. It appears to me that both were remarkably similar in habits.

On approaching the coast we saw single birds or long lines of them flying here and there in a frightened manner close to or near the water, often almost touching the waves with their wings as they veered or rose and fell in undulations like the billowy crests beneath them. They were never wild, but flew directly over our vessel or across her bows with as much freedom

as along the surface of the sea on either side of us. Their flight was strong and well sustained, the beats of their wings rapid and powerful. At times they would turn from side to side quickly, so as to show alternately their white bellies and their black backs. They appeared to prefer a long, straight line from which, if they veered at all, it was suddenly and in a right angled direction. The nearer we approached the coast the more abundant they became. They filled the waters and the air around about and above us. We could have shot hundreds from the deck of our schooner, as she bowled along without apparently diminishing the number about us or frightening off those already around. They would often drop suddenly, as if shot, to the water beneath them, where they would remain, evidently perfectly at home, keeping pace with us with their swift swimming, or diving with incredible alacrity and remaining beneath the water for several minutes to appear in some direction contrary to that looked for to continue their gambols, or to take wing as suddenly as they took to the water and disappear in the distance.

On the approach of stormy or foggy weather this species, or its neighbor the Foolish Guillemot, I could not learn which, though perhaps it is a habit of both species, assembled in large numbers near some shoal, out at sea a little ways, and seem to go through with sort of a mock caucus or citizens' assembly, each bird uttering hoarse rasping note that together can be heard a mile away. From the resemblance of the sound to the word used, the people call them at such times, "gudds" and

the noise reminds one more of the wrangling of human voices at a "town meeting" than of anything else that I can imagine. Nor at these "meetings" did the sound of our guns seem to frighten them in the least; they would simply move off in a body; farther to sea, and then continue their strange manoeuvres even more fiercely than ever.

When in flying they wish to turn in some contrary direction, they open and shut the feathers of their tail as if, thereby, to more surely direct or assist their motions. The people shout and wave their hats at them and call out "turn-about, turn-about" or "gudd, gudd, gudd" and various other words and expressions, thinking thereby, so they say, that the birds will turn and fly directly at them and in fact it seems as if they often did this very thing. Many a fine hour's sport have I had practicing upon these same fellows when on the wing, and it requires a good gun and a heavy charge to kill, at the first shot, these tough, hardy birds, yet we often ate the flesh of their breast, when thoroughly boiled and found them very good and not at all fishy.

I will not attempt to accurately describe the eggs of this bird. When once seen they can never be mistaken for the eggs of any other species with which I am acquainted. The ground color is white, and there are black scrawls all over its surface chiefly concentrated into a blotched ring at the greater end, with rarely any markings at all on the smaller end. They are deposited anywhere in clefts of rocks, in open situations, and wherever the bird happens to be when desirous of laying. The breeding habits of this

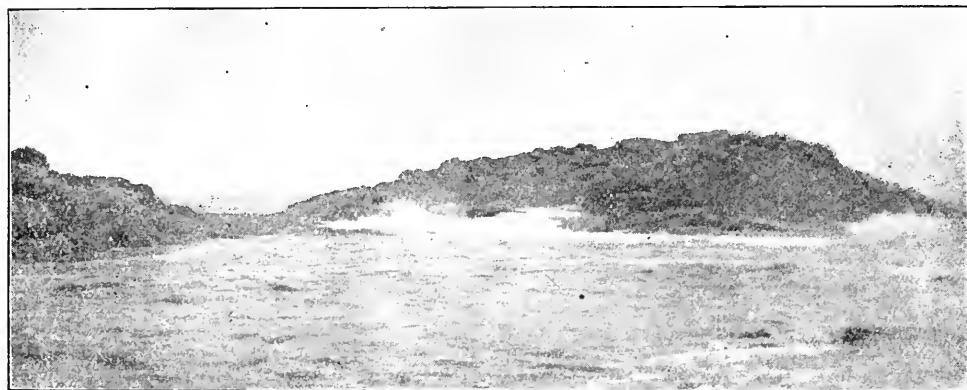
bird, are like their other habits, to me at least so similar to those of the Foolish Guillemot, that I must leave the discriminating between them more closely for others.

COMMON PUFFIN—PARRAKEET.

Fregata artica.

However similar in habits the Razor-

billed Auk and Foolish Guillemot may be, it is different with the Puffin, another of Labrador's characteristic birds, which has habits peculiar to itself. We found the Puffin occasionally only as we approached the Labrador coast, and occasionally only until we reached its vast breeding grounds the Parrakeet and Greenley Islands, just within the mouth of the straits of Belle Isle.



Greenly Island; the home of the Auks and Puffins.

Here they congregated in tens of thousands nor was hardly a single bird seen until we were within half a mile of the islands, then they arose of one accord, and as if with a common impulse, began circling around their abode and nesting place. If there were one hundred birds, there were as many thousand. They flew above, about and around us; they lined the waters, they sat like sentinels upon the shore and rocks, like flies upon a plate of molasses, or hornets upon a sugar barrel. They seemed utterly bewildered by our presence, and so tame that we could almost catch them or pick them up in our hand. They had tunneled the ground with their holes in every direction, and hundreds peered cautiously from their burrows or flew from them

to join the dense black ring that wound around and around the island.

Their burrows extended far into the loamy earth of which the island was composed, notwithstanding the impediments in the shape of rocks everywhere, above and below the ground. I doubt if man or animal could have picked its way across this island without stepping upon or breaking the earth's crust into one of these holes. They are made by the bird itself, aided by its strong bill and sharp and powerful claws. They are about the size of the body of the bird or a little larger and generally from two to three feet deep. They wind and bend and often intermingle, much as in the case of the well-known Bank Swallow. At the extremity is a very little dried grass and



A View of the St. Lawrence on the way to Labrador.

a single white egg, with seldom any other marks excepting perhaps a few obsolete scrawls or spots, and a general bluish or brownish tint upon the otherwise white shell.

My notes, add a few remarks which may be of interest; "A great trick of the Labradorians is to get a greenhorn to stick his hand into one of these burrows of the bird when the bird is supposed to be within. If you examine carefully the bill—of horn, nearly two inches in length and about the same in height—you will see that a most alarming pair of forceps may be thus put into motion, and, as the bird is one of the fiercest of its kind, can readily imagine why the victim never repeats the experiment.

The number of birds that I saw on Greenly Island was simply immense, and could never have been counted. I have often seen the water covered with a clustered flock, all engaged in making the hoarse, rasping sound that has been mentioned before, and is not unlike the filing of a saw, that is made by both the Auks, and which gives all alike the name of "gudds." When on the wing I seldom if ever saw them mix with other birds. Though they appear in large numbers at stated times, they disappear or rather disperse after breeding almost as suddenly as they came; yet stragglers do not leave until the harbors are nearly if not quite blocked with ice.

At Greenly Island, although there is a large fish canning establishment, houses, and a lighthouse on the North-east end, these birds occupy the other side unmolested and are seldom interfered with by gunners; yet the island,

is scarcely three-quarters of a mile long and even less than half a mile wide.

The flight of the Puffin is as swift as an arrow. It has no notes that I could perceive. Then in the water it is obliged to rush over the surface some feet, flapping its wings and apparently paddling vigorously before it can gain sufficient impetus to take flight. When sitting sentinel-like on some rocks, previous to taking a downward plunge into the air to wing, it reminds one greatly of pictures of Auks and Penguins, which birds they greatly resemble in many respects. We found the breasts of this bird when made into a soup and boiled thoroughly not bad eating, though much tougher than were the Auks we tried.

The Nesting Habits of the Yellow-billed Tropic Bird.

The Yellow-billed Tropic Bird (*Phaethon flavirostris*) better known to the Bermudians as the Boatswain Bird, is an abundant representative of the Bermudian Avifauna. My first acquaintance with this bird was on August 2d, 1894. When about 10 miles from Bermuda I was greeted by a pair of Tropic Birds flying over the steamer uttering their peculiar cries.

The Boatswain Bird, I was informed by Mr. Hayward, lighthouse-keeper at St. David's, arrives in the Burmudas about the latter part of March and remains until about the 25th of August, when they gradually disappear. Although distributed all around the islands, I know of no place where they are more abundant than on the islands in Harrington Sound.

Trunk Island, of comparatively small area, seems to be a favorite resort, as

it was here that I found more nests than all those which I observed elsewhere. On the shore of this island are a great many crevices among the rocks, which form the nesting places of this bird. I found two nests not more than a foot apart, and each nest had its bird sitting on an egg. This would have made a fine picture for "THE MUSEUM," but unfortunately I had left my camera at the house.

The eggs are laid on the bare ground unless anything is handy with which to line the nest. The bird never lays more than one egg at a setting and has several settings each season. The eggs are chalky white, thickly spotted with chocolate-brown becoming more dense at the larger end and often presenting a smeared appearance. In some specimens the color varies from a reddish brown to purplish chocolate, but the predominating color is chocolate-brown. The average measurement is about 2.23×1.53 in. The measurements of three specimens are as follows: 2.24×1.50 , 2.19×1.54 , 2.26×1.53 in. respectively. The first was found at the entrance to the Shark's Hole, along the shores of Harrington Sound, in a hole in the rocks about five feet from the water. The second was found on Trunk Island, in Harrington Sound, in a crevice in the rocks. There was nothing in the nest for lining except a few feathers of the old birds. The third was also found on Trunk Island under a pile of large rocks which had fallen down and formed a place for a nest. This was lined with some weeds and a few feathers. The birds lay at least two eggs in a season and probably more as there were a great many young and a few eggs examined when

we made our visit to the islands, which was very late in the season.

The birds are very reluctant in leaving the nest, in fact they will not leave until removed by hand. I tried to get one old bird off the nest by poking her with a stick, but without avail. They are not very nice things to handle, especially if they can get a chance to use their sharp serrated bills. I used a hand net which I threw over their heads, and getting them tangled in the net, managed to remove them from their nests. The young are gray in color, in fact they are gray all over, feet and bill, and present a striking appearance, looking not unlike balls of cotton. One of the members of our party and myself tried to get a photograph of two youngsters, but they were so young and unshapely that when the picture came out they had very little resemblance to any thing except a bundle of cotton.

Both the male and female have two long tail feathers, but in every specimen which I saw there was only one which I suppose was due to moulting. The birds have a graceful airy flight and fly very low at times nearly touching the water. While my trip to the Islands was rather late in the season for collecting, I managed to get a few specimens of birds and eggs. The Bermudian government, I believe, imposes a fine of 5£ on the offender for each bird killed.

B. BUCKENHAM,
Chestnut Hill,
Phila., Pa.

December number will contain a fine illustrated article on Pacific Coast Starfishes. Don't miss it.

THE MUSEUM.

A Monthly Magazine devoted to Ornithology, Oology, Mollusca, Echinodermata, Mineralogy and Allied Sciences.

Walter F. Webb, Editor and Pub'r,
Albion, N. Y.

Correspondence and items of interest on above topics, as well as notes on the various Museums of the World—views from same; discoveries relative to the handling and keeping of Natural History material, descriptive habits of various species, are solicited from all.

Make articles as brief as possible and as free from technical terms as the subjects will allow. All letters will be promptly answered.

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WALTER F. WEBB,
ALBION, ORLEANS CO., N. Y.

NOTES.

We had the pleasure of a personal call a few days since from Mr. C. P. Wilcomb, Custodian of the Golden Gate Park Museum, San Francisco. He is about to loan his entire collection of eggs to their museum. Also Mr. L. I. McCormick of the Glen Island Museum of Natural History, New York City. Mr. McCormick intends to spend the winter in the Mediterranean collecting. Prof. Henry A. Ward also called on us just before going to press. Prof. Ward, as many of our readers know, is at the head of the famous Ward's Natural Science Establishment at Rochester, N. Y., the largest of its kind in the world. He starts in a couple weeks on a big

collecting tour, stopping at various points on the Mediterranean, Red Sea, Indian Ocean, Calcutta, Singapore, etc. We doubt if there is another man in the world with as wide experience as a collector, having crossed the Atlantic 28 times on similar trips to this one.

We here extend an invitation to all Collectors and Teachers coming near Albion to stop off and see us. We are easy of access, having moved the entire business of the late Lattin & Co. into new quarters in the village, the old concern being located two and one-half miles north in the country. We are glad to "take care" of all who can come.

Having had various inquiries as to where F. B. Armstrong had gone, the publisher of the MUSEUM having recently bought his entire stock, will say; he is hard at work collecting probably as fine a lot of birds as have ever been taken in Mexico. The bulk of his stock will be advertised in later issues.

Messrs. Scuthwick and Critchley report a fine specimen of American Egret killed at Seacoronet, R. I., Oct. 12, also an immature Duck Hawk at Newport, R. I., Oct. 10. Both birds are very uncommon in that section.

Mr. Kirk B. Mathes, formerly with Lattin & Co., has gone to St. Augustine, Fla., where he has opened a high class Art and Curio Store. Any one desiring any relics or Florida

Curios from this the oldest city in America, can probably get them by writing Mr. Mathes as we know him by experience to be of unusual amiable disposition.

Mr. E. Haymond a Taxidermist of Flint, Mich., writes that he has just had sent into his shop a large Bald Eagle which measures from tip to tip 7 feet and 3 inches. From base to tip of mandible 3 $\frac{1}{2}$ inches. From tip of tail to tip of mandible 3 feet. Weight 10 pounds. The bird was taken near Flint and gave the farm hand who captured it a lively tussle before he succeeded in killing it. It had been wounded by some gunner, and had evidently flew as far as it could.

We shall be pleased to receive and publish at all times, records of rare finds in the Ornithological line.—Such items are often of great interest.

Atlantic Coast Star Fishes.

The Eastern coast of our country, while not so prolific in forms of sea life as some of the more tropical coasts, is nevertheless quite as interesting as any with which I am familiar.

Order I.

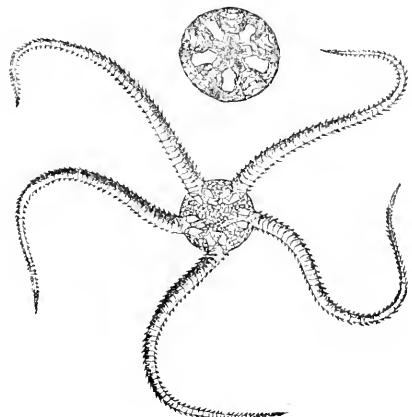
OPIIIUROIDEA. One of the first families to claim attention, is the family Ophiuroidea, a group of star fishes having a more or less sharply defined central disk, containing a digestive cavity, which does not pass into the arms. In this respect they differ from the true Asteroidea. There is no opening at bottom. The arms have a number of

arm bones, resembling vertebrae, each of which is made up of two sections. The axis being usually covered with plates or sometimes with a thick skin having rudimentary plates beneath, and the side plates of the arms usually are covered with teeth. The nerves are located inside of the arms, also what is called the ambulacral vessel of the water system, which I will explain latter on. The water feet are simply small fine points without suckers at their tips. Each of the five angles of the mouth, is formed of five pieces or arms. The extremities of these mouth-frames are firmly fixed to a jaw, and attached to the inner edges of each pair of jaws is a narrow plate, which supports a number of processes, which doubtless serve the purpose of teeth. The general arrangement of the water and nervous systems is on the ordinary star-fish plan. The enlarged portion in the center is the body cavity and surrounds the digestive tube.

The various species of this family are rightly considered the most beautiful and delicate of all the animals of the sea. Many are covered with spines and marked with beautiful colors, arranged in bands and spots; others get their beauty from the grouping of their armor plates, but in whatever way produced no one will admit they have any superior in Natures great ocean wonderland. They are commonly called Serpent Stars and by reference to cuts, one sees the serpent like appearance at once. In all cases they are delicate creatures and do not like to be interfered with. In fact, some when taken from the water, will snap arm after arm from the body until in some cases only the central disk

is left. Thus in case of danger rather than give up the whole body to some greedy fish, they give over only a part thereof. The little animal really suffers but little from this loss, for nature soon heals over the wound, and a new arm grows out in place of the old. It is not uncommon to see an Ophiurian with three or four arms and one or two just sprouting out. During their early stages they pass through quite a metamorphosis. The young is a free swimming animal but in the course of growth it becomes sluggish and settles to the bottom, where it ever remains afterward as a creeping creature. It is very commonly found among the tangle and eel grass where its protective coloring affords it a safe retreat. They rarely have over five arms. There are now over 500 described species of this Order, about half of which are found between low water mark and thirty fathoms, and the balance between thirty fathoms and one thousand, or more.

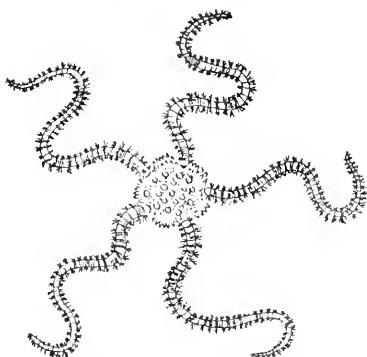
One of the commonest along the Massachusetts coast is *Ophiomusium armigerum*, and another longer spined



variety is *Ophiomusium Lymani*, near Cape Cod. This variety has been

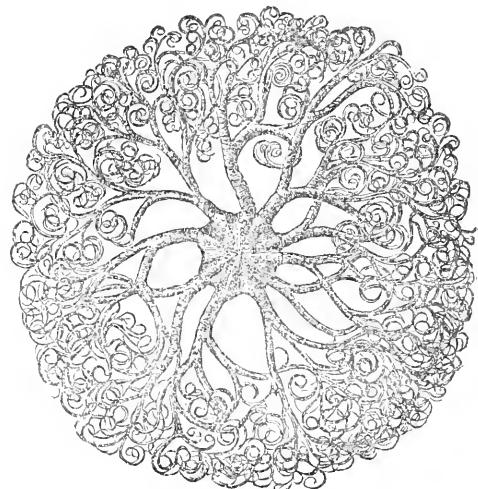
brought up in deep sea dredging in large numbers by the U. S. Fish Commission, the past few years.

Ophiopholis aculeata of Bay of Fundy, often called Brittle Star, is a very common species. It is of a reddish



brown color, and covered with short flat spines. Usually three to four inches in diameter.

Astrophyton Agassizii of Maine, the only species of the family Astrophytidea that we will mention here, is more commonly called Basket Fish or Medusa's Head. The species lacks



the protective plates of those noted above but have in place of it a thick skin in which are imbedded rudimentary plates. It also has no arm spines.

or mouth shields. The terminal branches, however, are often computed to be several thousand. They are found on the various islands south to the Bahamas. Mature specimens measure from 9 to 18 inches across.

Order II.

ASTEROIDEA. For years the true Star-fishes and Ophiurians were confounded in one general Order, but after careful study one finds as important differences between them as those which separate either from the Sea Urchins. In the Asteroidea, the stomach and ovaries run into each of the arms the entire length so that if any part of the animal becomes detached from the main body, it has the power of growing into a full fledged Star-fish. This is one of the most interesting and curious facts connected with the Order. The Water system consists of a canal running the entire length of each arm. The sexes are distinct but can only be distinguished by microscopic examina-

tion, for the glands which are situated on each side of the interior of the arms or at the junction of the body with the rays. The species lays eggs which pass out of a pore on each side of the base of the arms, situated between two plates and difficult to detect. The embryo is usually a free swimming animal as with the Ophiurians, and develops rapidly. I regret space will not permit following it through its successive stages to the mature animal.

One of the first Astropectinidea to be considered is a large species from Bay of Fundy, *Solaster endeca*. [fig. 1.]

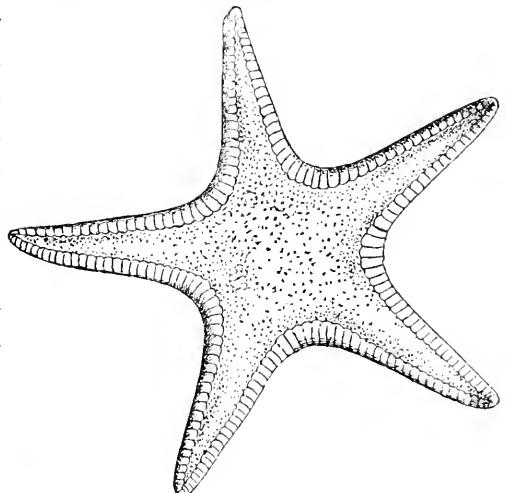


Fig. 2.

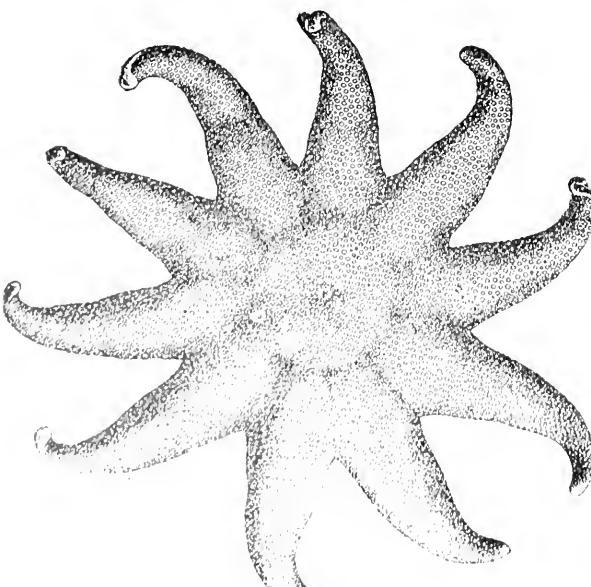


Fig. 1.

It has nine to eleven rounded tapering rays. The under surface is a rich cream, which presents quite a contrast to its colored back. It has rather a smooth appearance and is much sought after by collectors.

Luidia clathrata from Florida is a species not often met with in perfect shape as it has a habit of breaking into hundreds of fragments as soon as it comes into contact with the air. It measures from 10 to 18 inches across and its rays are long and finger-like.

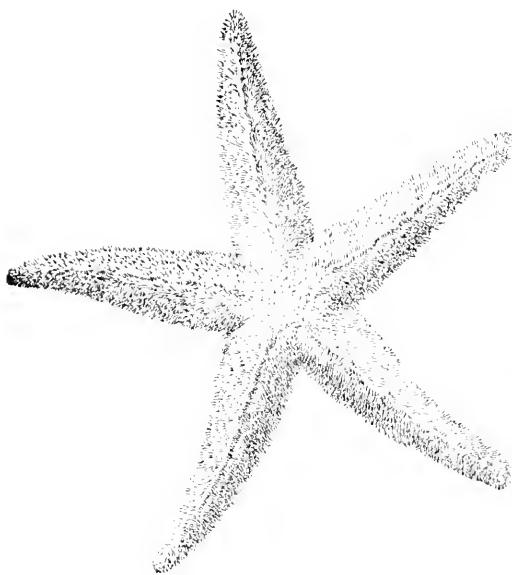


Fig. 3.

Archaster Agassizi [fig. 2] from the Massachusetts coast, is a deep sea form but quite interesting. It is found from 50 to 2,000 fathoms and measures three or four inches across. It is of a creamy buff color. Closely allied to this is *Archaster Americanus* from same locality but usually found in water from 75 to 125 fathoms.

Asterias vulgaris [fig. 3] of the N. J. coast is a very common species. In fact this species with *Asterias berylinus* of the Massachusetts coast and *Asterias Forbesii*, a very small species of Narragansett Bay, are found in great numbers in their respective quarters. *A. berylinus* is found from Halifax to Florida, while *A. vulgaris* ranges from Long Island sound to Florida, both being common in Massachusetts bay. It is very interesting to watch their movements, and I shall dwell to some extent on these species, as doubtless the largest number of people in the U. S. are familiar with them. From under the surface of the arms, at whose union

is situated the central mouth, a great number of delicate tubules, each one terminated by a minute sucking-disk, may be seen to be vigorously in motion the whole series undulating like wind swept grain. These tubules are hollow and fed from within with sea water, the increase diminution of which within the tubules, regulated by the will of the animal, determines the length to which they may be extended or protruded. Attaching themselves to foreign objects by means of their sucking-disks, the animal may in this way be either drawn forward, or the object of its search drawn to it. The system of vessels that supplies the tubules with water, governing as it does the walking apparatus of the tube-feet, is known as the "Ambulacral" system spoken of heretofore. The area, again, along which the tube-feet are placed, has been called the "Ambulacral Zone" and the intermediate spaces, the sides and backs of the arms, --the interambulacral. On the back of the animal, a little sub-central, and in the angle between two of the arms, is a tumid little body, of a bright orange color, called the "Madreporic tubercle" through which the sea water gains access to the ambulacral system of vessels. All species of Star-fishes, but this one especially, are voracious animals, and they have a method of securing their food which is at once novel and to say the least effective. Seizing their prey which consists largely of shell-fish, they arch themselves over it, turn their stomachs inside out, so as to completely envelope the delicate morsel, and then deliberately proceed to make a meal. In fact, on some parts of our coast, as Maryland,

this Star-fish is the principal enemy of the oyster, and vast quantities of the latter have been gobbled up in a single night by them. They usually make their appearance immediately after the common Atlantic Scallop. We now come to the mammoth Bahama and Florida species, *Oreaster reticularis*. Every one has seen this mammoth species, as large across as a half bushel measure, and fully six inches thick. They are usually to be found in the markets of most of our large cities, being sold, however, simply as a great curiosity. It occurs on both sides of the Atlantic. The upper surface is reticulated by the crossing of the hard parts of the skeleton, and beautiful ornaments are made by removing all the softer parts and leaving only the latticed skeleton.

A few words with reference to collecting these specimens of the mighty deep, and preparing them for scientific study, and I will close. I can do no better than quote from W. T. Hornaday's excellent "Taxidermy and Zoological Collecting": "Of course when first taken from the water they are limp and pliant, but after standing in an alcohol bath for a short time they become perfectly rigid. If left to themselves when thrown into spirits, the smaller and more serpent-like species persist in tying themselves up into double bow knots and insist on keeping themselves so forever. Since the way to cure a Star-fish is to soak it in alcohol for from six to twenty-four hours according to size, and then dry it flat and in good shape, it becomes necessary to pin the small ones firmly in shape upon thin boards before immersing them, and then they will stay

where you put them. See to it that while in spirits, all your Star-fishes large and small, cure in proper shape, flat and with each arm flat and extended in the right direction. After removal from the spirits, pin out those not already fastened upon boards, and let them dry. I have never found it necessary to poison the spirits, for the reason that dermestes and other insects seem to respect a dried Star-fish for his own sake."

It will be impossible to dwell further on these interesting forms of Sea Life as I have already occupied more space than assigned to me. I trust that the brief remarks given, to those who have never studied these families, may be a stimulus to greater effort along this line.

Notes From Interior of Mexico.

Just before the last form of the MUSEUM is to go to press, we have a line from the well-known taxidermist and collector, Mr. Frank B. Armstrong,

The letter contains many very interesting points relative to his present field from a collector's standpoint and shows up also quite vividly the class of people one would have to associate with and live among in a summer campaign in Eastern Mexico. I can do no better than quote Mr. Armstrong's own words:

"After eight years of diligent field work on the lower Rio Grande in Texas with good success, and having exhausted most of the rare finds in that section, and further after having thoroughly mastered the Mexican language I determined to change my field of operation to a more virgin land. After considerable travel through Mex-

ico I concluded to make my headquarters in Estadas de Tamanlipas. I am located on a ranch in the heart of almost a wilderness but really a collector's paradise. Owing to climate, vegetation, etc., I am satisfied I am within reach of all tropical and semi-tropical products, in the way of Natural Science. I struck this country with a set determination of bringing to science everything of interest and for the past few weeks have been studying bird and animal life in their peculiar haunts. It is a great pleasure to me to be in a new field where I can constantly look for new species of birds and mammals. Next spring I hope to secure a large number of eggs, many of which will be practically new to collections in the States, as Coppers-tailed Trogon and 2 or 3 dozen other species. Some of the more common birds one meets with are Texan Kingfisher, Gnat Ivory-billed Wood-pecker, Great Rufous-bellied Kingfisher, Motmots (the birds that with their beaks trim off two of the long feathers in their tail for a space of an inch or so, making the tail look as if there was a tuft on the end), Becards, Inca, Doves, Goldfinches, Wrens, Trogans, Derby Flycatcher, Parrots various kinds, Brown Jays, Mexican Crows, Ani's, Squirrels and a large fauna of small mammals. I am now making up a series of these. I hope in later letters to give the readers of the MUSEUM notes on some of my trips after birds, and some of the curious traits of these semi-tropical species.

"To the north of my headquarters stretches immense swamps covered with shrubbery, coarse grasses and "Tular" as well as *Malaria*? To the

south runs the Tamesi and Paunco Rivers, and heavy forests, while to the west stretches the Sirra Madre range of mountains and table lands. Most any kind of collecting ground is within a few days journey on, as the Mexican's call it, God's own animal the burro, an animal well adapted to the country and people, who depend on him to do everything, even to living without food or water, subsisting on brush fences and rags. Here is the country where ants build wooden houses in trees and where everything that grows except the *Burro* has thorns on it, some of which are trained to hold you when you are following something rare or throw you down while another species stick you.

This is the home of the air plant that will grow without moisture or taking root on anything.

"Here also live a race of people who harmonize with nature except on some the thorns are replaced by scales. Nature has learned these people a good many things, viz: That it is always best to put off until tomorrow what you can as well do today and never provide for the morrow. It will take care of itself. If they haven't got anything to eat some neighbor has and it is all the same. Food is easily gotten. Fruit grows in abundance and by way of variety, corn can be hammered out into Tortillas (bread) and parched corn makes good coffee. Red peppers grow in the yard and dried meat lasts forever, so what do they want? Clothes are hardly necessary although some of them do wear a few. Their houses are easily built out of poles and mud with palm leaves roof. With the aid of a little native music

and their melodious voices they can make night as hideous as you please. They are always happy and glad to see strangers, and will accept anything you offer them or anything you carelessly leave around. It is very pleasant to be entertained by a lot of them and they take great interest in your wares especially a freshly made up bird skin or something that can be broken in handling. They will stay with you at camp as long as your larder is full and will cheerfully allow you to bring all the wood and water, do all the work around camp, occupy your seat and put things where you can't find them. They know the names of all the birds and have them well classified as will be seen when I say they have the Woodpecker and Mockingbird in the same family. They seem to be glad they are living and really they ought for they want for nothing, except for more Naturalists. A good collecting place is right among them as the birds and animals seem to come out of the thickets to mingle with the natives. Only a few days since a Jaugar carried off a burro near town in daylight.

"I find a great many tropical species here whose habitat is given farther south, and so far many species that I have not been able to identify from the books of my own. These I shall hope to cover in a later letter.

Glaciers of Greenland.

The following entertaining and instructive article from the pen of Prof. Thomas Chamberlain, head of the department of geology of the University of Chicago, who accompanied Lieut. Peary's last expedition to the far north,

recently appeared in the *New York Commercial Advertiser*.

The study of Greenland glaciers, says the professor, has a specific bearing upon one of the most widespread and important of our geological formations. The larger portion of sixteen of the northern states and smaller portions of eight or ten others are covered by a mantle of clay, sand, and gravel, filled with boulders transported from the north. This mantle forms the sub-soil of about one-third of the cultivated portion of the United States and a very large part of its fertility is dependent upon this. The spreading of this mantle over these States very much subdued the topography and thereby rendered the construction of railway lines and other means of transportation easy and economical where they would otherwise have been difficult and expensive, and in some cases impracticable. Many lines owe their existence to the smoothing down of the surface brought about by this formation.

The explanation of this deposit, which is known as the "drift," has been one of the most difficult problems of geology, and probably more has been written upon it than upon any other single topic in the whole range of science. It was formerly attributed to great floods sweeping down from the north. Later it was quite generally referred to icebergs floating over the region during a state of submergence. It is now generally attributed to glaciers that are believed to have covered nearly one-half of North America, reaching southward as far as New York, Cincinnati, St. Louis and Kansas City. It is only in Greenland and

the Antarctic regions that glaciers of such vast dimensions and of like modes of action are now found, and of these, Greenland offers the only accessible field of investigation. Hence the importance of studying its glaciers as a means of elucidation of one of our most important and interesting geological formations.

Evidences of like action are found in both countries. For instance, glaciers in moving over the surface rub away the soil and sub-soil and break up and carry along with them more or less of the rock below, and in doing this they score and groove and polish the underlying rock surface in a way altogether peculiar to themselves. They thus engrave their own record—their autobiography, so to speak—and we have only to decipher their language to read their history. The material that is carried along by them is also rubbed, bruised and scratched, and more or less ground to powder, and when the action ceases this material is spread out upon the surface or heaped up into ridges alone. All these characteristics are abundantly displayed in both countries, and it is quite clear that the work that is now being done by the glaciers of Greenland is of the same nature as that formerly done upon a large part of our country.

This implies great changes in our climate. The climate of Greenland probably formerly prevailed over our northern states. Glaciation is, however, a very strange phenomenon, and we do not yet know all its mysteries nor the full range of conditions that render it possible. I examined fourteen glaciers in the northern district, and three on Disco island. In a more

general way I saw something of three or four score others, but can hardly be said to have examined them. It should be understood that nearly all these are tongues, or lobes, of the great inland icecap of Greenland, or of local icecaps, and that the study of these icecaps was an important part of my work.

I visited the inland ice and had the good fortune to have the guidance of Lieut. Peary in a trip upon the main icecap, in which we went sufficiently far to get a typical view of the great fields of the interior. My studies were, however, chiefly on its margin, as it was most important to me to ascertain what was the nature of the base of the ice, and its methods of erosion, transportation and deposition. The glaciers of the Alps, and of mountains generally, are chiefly formed from snows accumulated on the upper slopes in lofty amphitheatres or in the ravines or gulches that crease their peaks. These creep down the valleys, often joining similar streams from adjacent valleys. They may be likened to the branches of a tree, gathering into a common trunk. The glaciers of Greenland, on the contrary, chiefly spring from an icecap, which covers the whole interior. From this icecap tongues creep out in all directions. Instead of several snow fields gathering to form one glacier one snow field sends out many glaciers. The great icecap of Greenland puts forth some hundreds of glaciers. There are, however, glaciers of the Alpine type in Greenland.

One of the most obvious characteristics of most of the glaciers I studied is their termination in vertical faces,

even when they end on the land. Most known glaciers slope down to a thin edge at their extremities. These commonly, not always, end in vertical cliffs of ice 100 to 150 feet high. The sides also are frequently vertical. By reason of this they reveal many features that are usually concealed. I have never before seen glaciers that presented such admirable facilities for investigation as those of this northern region. The most striking structural feature revealed by those vertical faces is the pronounced stratification of the basal ice.

Not only is the ice definitely bedded, but the rocky and earthy material which the glaciers carry in their bases is arranged in layers. In some cases the layers are twisted and comforted, and in others they are shoved over each other. The detailed study of these gives many clews to the modus operandi of the ice action. The rate of movement of the ice generally is very slow. In a few of the more vigorous glaciers, where action is concentrated and intensified, the movement is considerable, but on the average it is probably quite safe to say that the movement of the ice border is less than a foot a day, probably less than a foot a week. It is certain that the ice once extended some distance beyond its present border, but I think I have good evidence that it never completely overwhelmed the coast region, at least, not in recent times. I am confident that it never extended across Baffin's bay and Davis' straits to the mainland and formed the center from which the glaciation of our country was derived, as has been held by some geologists.

The glaciation of our country must have had a center or centers of its own. I discovered a small driftless area on the borders of Bowdoin bay, a phenomenon which has a very important bearing upon the former extension or rather non-extension of the ice. I know of no other region that offers superior or even equal facilities for glacial study. The great variety of glacial forms and freedom with which the structure is exposed make it an extraordinarily rich glacial field. The available season is short, the distance great, the obstacles considerable, the dangers something, but to the earnest student of glaciation it offers rewards that fully justify all expense and risk. I would only recommend it, however, to serious investigators fully aware of its contingencies and adequately prepared to meet them.

The immediate district of Inglefield gulf presents at least four great series of rocks. At the base lies a complex mass of crystalline rock of the granitic, or more strictly, gneissic class, probably of Archaen age. On the peninsula east of Bowdoin bay there are quartzites that closely resemble those of our Huronian period. Overlooking the crystalline rocks unconformably there is a series of red sandstones probably 1,000 to 1,500 feet thick. On this lie light grey sandstones, probably 1,500 to 2,000 feet thick. Over this again lies a series of thin, brownish sandstones and shales that perhaps reach 2,000 to 2,500 feet in thickness. All these are traversed by dykes of igneous rocks, cutting them in various directions.

No fossils have yet been found in any of these rocks and hence their ages.

are not known. Judging from the bowlders which the inland ice bring out to its border the interior of Greenland opposite this region must be occupied by crystalline rocks, probably of Archaen age. The specimens brought back from Cape Farday and Clarence Head by the party that visited Ellesmereland show that sandstone and shales, as well as granite and igneous rocks, occur there also.

Some Common New England Rocks.

One of the most common rocks throughout New England is *Mica Schist*. It is probably next to gneiss the most abundant rock. It is chiefly composed of mica, but has thin layers of glassy quartz, which are short and overlapping. While it usually consists of mica and quartz, it may be composed of mica alone, or kaolin and clay, sometimes take the place of the quartz. In this case, however, the mica is usually very fine, and the rock is what would be called clay slate. Also when the mica becomes deficient, the substance passes into an ordinary quartzite. Quite frequently we find feldspar present in the mixture. There is probably no other rock that contains such a large variety of beautiful accessory minerals as mica schist. This makes it one of the most interesting and attractive rocks for the mineralogist. Also, few rocks are so distinctly stratified; and the stratifications can usually be observed in hard specimens. The mica may be either muscovite or biotite, or both, but the former is most common. There is probably no other rock that shows a greater variation in the per-

centage of silica which it contains as mica schist, for as above noted, we find it from almost all mica to almost all quartz. A rock that is closely related to mica schist is hydromica schist, in which the ordinary anhydrous mica is replaced by dydromica. It is easily distinguished from mica schist by being somewhat softer, less harsh to the touch, and less lustrous.

Gneiss, is the most important of all rocks. It probably forms half of New England and a very large proportion of the earth's crust. The name pronounced the same as *nice*, is known to have originated among the Saxon miners, but its precise derivation is lost in obscurity. It is usually composed of several minerals, the most common of which is pink feldspar-orthoclase. By close examination we find also small quantities of quartz, which usually forms in small irregular, glassy grains, entirely devoid of cleavage and scratching glass easily. On weathered surfaces, we find the orthoclase soft and chalky, while the quartz remains clear and hard. It has usually been considered that the three main constituents of gneiss was orthoclase, quartz and mica, but it is now recognized that he may have true gneiss without any mica, and that the latter may be represented by hornblende. When the gneiss is composed of quartz and orthoclase, it is called *binary gneiss*. When it contains mica in addition to the above, we call it *micaaceous gneiss*, and of hornblende, *hornblendic gneiss*. However as noted above, orthoclase usually comprises one-half of the rock. In addition to the above minerals, we frequently find as accessory minerals,

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—
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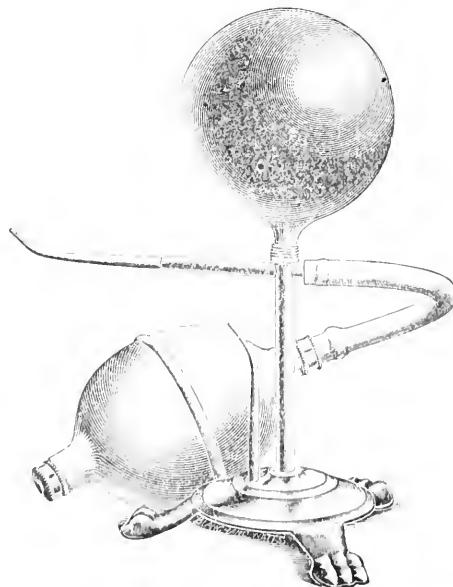
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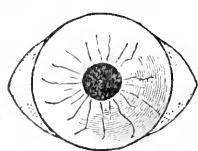
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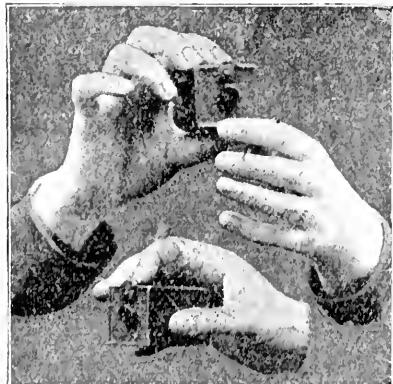
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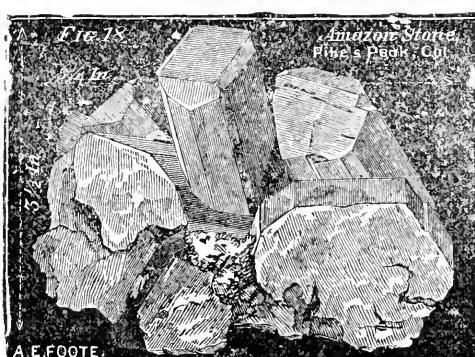
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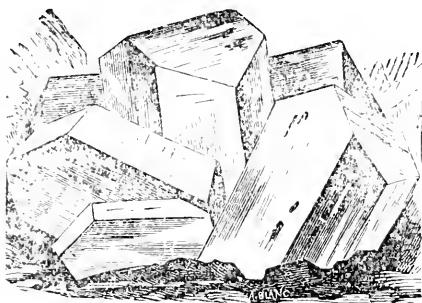
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VOL. I.

NO. 2

DECEMBER, 1894.

THE MUSEUM.

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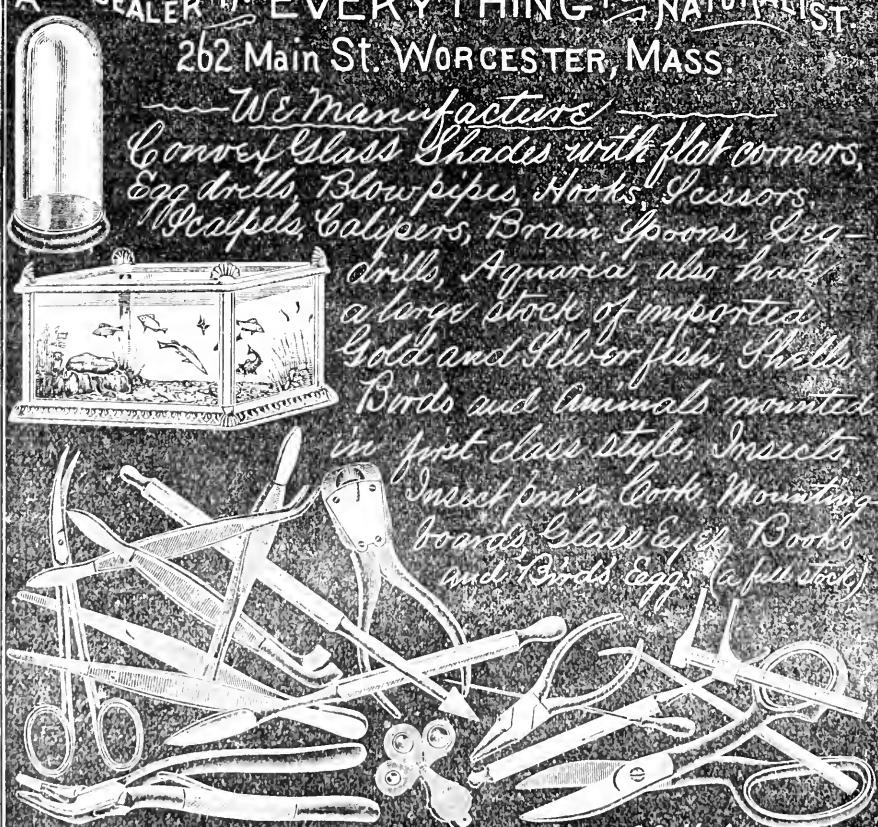
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THE MUSEUM.

A Monthly Magazine Devoted to Research in Natural Science.

VOL. I.

ALBION, N. Y., DECEMBER 15, 1894.

No. 2

An Ornithological Paradise.

Some Observations Gleaned from a Sojourn on the Famous Farallone Islands.

By C. BARLOW, SANTA CLARA, CALIF.

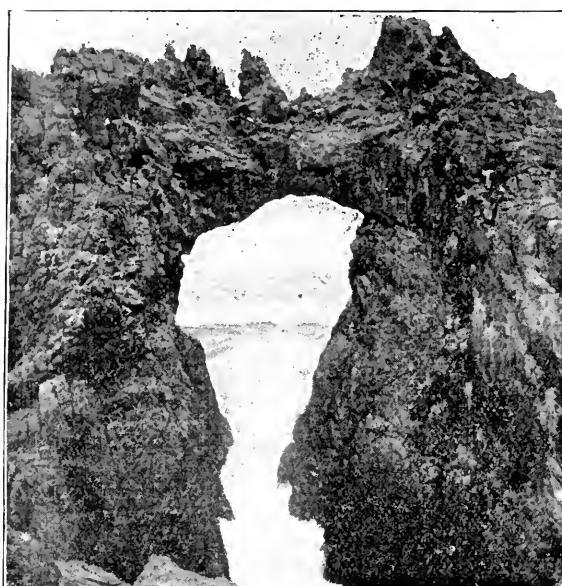
I have been asked to give the readers of "THE MUSEUM" an accurate and comprehensive account of bird life on the wonderful Farallone Islands, and while I am aware that much has been presented on this subject, I believe there is much more to be learned.

There is a fascination in visiting the homes of the sea-birds on the rocky, isolated cliffs, and while the surroundings, of collecting along the creeks and in woodland are lacking, there is much to interest and instruct. The South Farallone Island, which is the only accessible one of the group lies about 35 miles out in the Pacific from San Francisco, and if one has secured the necessary permit he then may take his chances on catching an out-going tugboat, which usually cruises out as far as the islands, in search of vessels bound in. The Farallone Island being centrally located has been the most popular collecting ground to ornithologists, but each summer collectors became more numerous, restrictions placed on granting permits, and one is indeed fortunate to secure, at the present day, the permission which will entitle him to a landing on the island.

Myself and friend were in San Francisco the middle of June but found that no boat was to leave the following morning, so we spent the time as

best we could. However we had assurance that on Sunday morning, the 17th a "tug" would go out, so we accordingly camped on and about the wharf, for "eternal vigilance" is the price of catching a boat bound for the Islands. Six o'clock found the staunch tug steaming toward the Golden Gate. The morning was one of those clear ones seldom to be encountered at sea. As we got well off the mainland sea birds began to appear, but soon a dense fog shut out the scene and no bird life was visible excepting a lonely albatross which swept about the boat now and then. Soon the shrill voice of the fog siren on the Island came to our ears and a few moments later a long blast from the stentorian whistle of the tug announced to the inhabitants of the Island our arrival, and presently the cliffs loomed up out of the fog. A boat put out and we were shortly landed and were among the vast rockeries of Sea Fowl which were screaming on all sides.

The South Farralone is about one mile in length and one-half mile wide at its broadest part. In places it narrows down to a mere neck of land. Throughout are peaks and elevations which the keepers call "mountains" but in places are flat areas several acres in extent which extend to the ocean. On these flats are rocks and boulders and the bleached bones of birds and rabbits. There is not a tree of natural growth on the entire island but in spring a pulpy weed known as "faral-



The Great Arch, 150 ft. high, tenanted by Murres and Cormorants.

"lone" weed carpets the island. Aside from the birds there are many interesting features to be noted. On some of the rocks adjoining the island are herds of sea-lions. Rabbits, too, are to be seen on every hand scurrying about among the rocks. The lighthouse which is one of the first order, towers above all at the summit of the highest peak—320 feet above the sea and its flashing light can be seen many miles. There are also caves of interest at various points of the island and an immense natural arch through which the sea rushes, which is at least 100 feet high. In winter I am told that the sight of the breakers is grand beyond description and the spray has been known to go over a rock 200 feet high.

For ages past the different Sea Fowl have come to the rocky cliffs to nest each year and it would be a hopeless task to estimate their numbers. There are ten species of birds that or-

dinarily nest on the Island—Tufted Puffin, Cassin's Auklet, Pigeon Guillemot, Cala Murre, Western Gull, Farallone, Brandt's and Baird's Cormorants, Ashy Petrel and Rock Wren.

The Cala Murre greatly exceeds in numbers any species inhabiting the cliffs and nests in rookeries, usually near the summits of the peaks. For years their eggs have been collected for the San Francisco markets where they meet with ready sale as they are twice the size of a hen's egg and are used by bakeries in the manufacture of pastry of all kinds. The Murres are peaceably inclined and are much imposed upon by the Gulls who steal their eggs at every opportunity. In two visits to the island I have never succeeded in finding a young Murre, but it is probable that the Murres succeed in hatching their eggs late in the season when the eggers have ceased to collect.

On the west end of the Island is



W. H. Osgood and one-half day's "spoils."

what is known as the "great rookery*." The entire side of an immense peak is covered with Murres from base to summit. In collecting these eggs the eggers take great risks and often become careless. Frequently they go down a damp, slippery cliff by a single rope which, should it break, would precipitate them onto the rocks far below. The eggs of the Murre present extraordinary variation as to ground color and markings extending from white through varying shades to a deep green. The markings are often very beautiful. It is of course, probable that an individual Murre always lays an egg of the same type. In connection with the Cala. Murre it is proper to mention the Western Gull which is the great enemy of the

Murres and Cormorants. Indeed were it not for the depredations of the Gull these birds would live in comparative peace whereas, now, it means the loss of their eggs if they are left unprotected for a moment.

The West. Gull is the only Gull which nests on the island. It nests chiefly in colonies on the level portions of the island, although a few pairs may be found almost anywhere. The nests are loose affairs of farallone weed and average perhaps a foot across. Usually they are very shallow and are given shape by the hollows in which they are constructed. If unmolested I am sure the complement is usually three eggs, but constantly robbing has the effect of reducing the size of the sets at times.

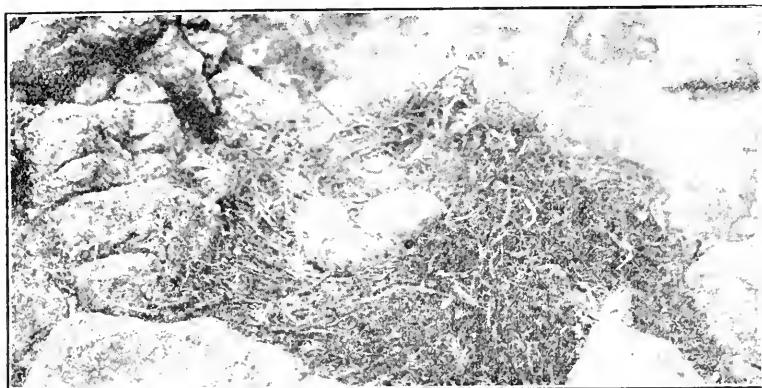
The eggs match well with the general color of the rocks and are often not to be seen unless one is in search

* We have reproduced a photo of this immense rookery, but at the last moment decided not to use it in this number as the quality of paper is not fine enough to warrant good results. (Ed.)

of them. They present great variation as do all Gull's eggs. In my series are eggs ranging from almost white to intensely dark ones. During the nesting season the Gulls become quite tame and I secured several by sitting down on the rocks waiting for them to fly over.

Perhaps the least approachable of all are the Cormorants. They nest in rookeries largely but almost any isolated cliff will be found to hold a few nests. The Brandts and Farallone varieties are much alike in size but

differ in the color of the gular patches. In the former it is blue and in the Farallone species it is yellow. When the latter are flying high in air this patch is easily discernable. Both these Cormorants nest in large rookeries usually on a sloping bluff or hill-side which commands a view of the surrounding territory. In one rookery of the Farallone species I estimated there were about 200 nests. They were placed in irregular rows and were about a foot apart. They measured on an average nine inches across and



Typical nest and eggs of the Western Gull.

were shallow, being composed of sea weed and farallone weed. They were compact and more or less cemented by the guano. The Cormorants are easily alarmed when they have fresh eggs and if a few of the rookery take wing all will follow and after circling for a few moments in the air they soar out over the ocean and settle in a compact flock, where they remain until the intruder has disappeared.

During the summer the eggers pass these rookeries every other day and every Cormorant that is in view will take wing when the Gulls speedily break the eggs and eat the contents.

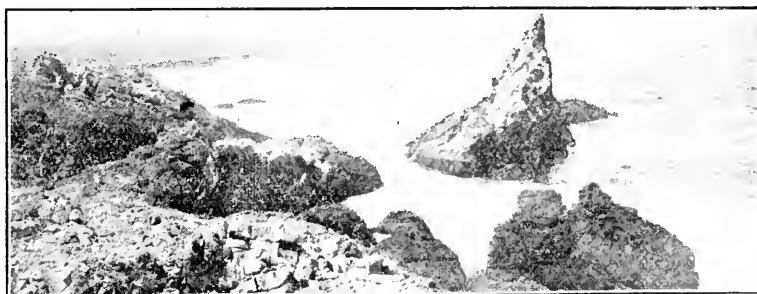
It seems strange that these foolish birds will return day after day to their

despoiled nests. Three or four eggs are usually laid and sometimes five. I took a set of six eggs of Brandt's Cormorant in 1892 but they were too badly incubated to save. The eggs of the Farallone and Brandt species are not distinguishable. Baird's Cormorant nests at most in colonies of half a dozen pairs, usually selecting some almost inaccessible cliff. Often the nests are built in a niche in a perpendicular cliff. The nests are smaller than those of the preceding species and are deeper and more compactly put together. I have seen nests nine inches high, but these had evidently been inhabited for several successive seasons. These birds select the wild-

est most picturesque places wherein to construct their nests and some which I examined must have been within reach of the spray in rough weather, for they were built on the sides of a little cove. The eggs are smaller than either Brandt's or Farallone's and are bluish-green in color with a thick chalky deposit covering the shell. Seven eggs of this species average $2.13 \times .90$ inches while a set of four eggs of the Farallone Cormorant average 2.37×1.53 inches. I have frequently found three eggs incubated, and believe this num-

ber constitutes a set as often as four.

I will here relate an incident which tends to show the instinct and natural love which bird mates have for one another. I saw a Baird's Cormorant sitting on the edge of its nest in a niche of a perpendicular cliff perhaps fifty feet up and wishing to secure a specimen shot it, supposing it would fall outwards to the ground. Instead it fell back into the nest and could not be secured. While passing this cliff the following day the dead bird's mate was seen sitting by the side of the



A bit of shore - The rock in the ocean is completely covered by Calif. Murres, but is unapproachable.

nest, frequently craning its neck down as if imploring its mate to join it. It was one of those pathetic scenes which one sometimes has occasion to witness in bird life. We came upon a rookery of young Farallone Cormorants, which embraced young of all sizes, each seeming to vie with its neighbors in presenting an awkward appearance. In their endeavors to avoid us a number of the young birds worked themselves to the edge of the cliff and were found dead at the foot later. Strewed about among the nests were numerous small fish which I took to be sardines. The odor arising from the rookery was anything but pleasant.

Thus far we have spoken of the

birds which nest largely in colonies, but the pleasure and variety of collecting lies not in these rookeries where one might fill baskets with eggs in few moments, but it is rather in climbing about the cliffs peering into the burrows and crevices that one experiences the pleasure of sea-bird collecting.

The Tufted Puffin and Cassin's Auklet are somewhat allied in manner of nesting, and both are usually found in the same locality, though the Auk nests in all situations about the island. The Puffin is at once noticeable by its formidable appearance as well as its striking plumage. It is found on the higher rocks and will not allow of close approach. They are very vicious when

captured and are said to bite to the bone if once they secure a hold. One egg is laid, which is of a dull white color usually marked with a few indistinct lilac or brown under shell markings, although occasionally eggs are found which have quite a heavy wreath about the large end. A series of these eggs exhibit great variation as to shape, size and coloration. The eggs are deposited in burrows in the cliffs, with a little weed sometimes used for a nest.

The Auklet is a fairly abundant species on the island and prefers the lower portions on which to nest. Here it is found in deserted rabbit burrows beneath the rocks and in all probability it often excavates its own burrows. It also nests about among the cliffs resorting to any crevice or tunnel in the rocks which may offer a dark retreat during the day, for it is nocturnal in habits. The single egg laid on the bare ground is large for the size of the bird. Seven eggs from my collection average 1.81x.31 inches, and vary in shape from equal-ended to sharply pointed.

The burrows occupied by the Auklets are usually filthy, and are easily discovered by the odor which arises. On June 19th a small colony of young Auklets was discovered, the birds ranging from a week old to almost full grown, although all had more or less down on them.

The "Sea Pigeons" or Pigeon Guillemots are among the most interesting of the birds. They are lovers of the sea and prefer the rocks near the surf when not incubating their eggs. We were fortunate in discovering a rookery of these birds, and had it not been late for fresh eggs a splendid series could have been secured. The hill at the

summit of which is the lighthouse, is very steep and the cliffs at the top are more or less honeycombed with burrows in which the Puffins and Auklets nest. Farther down is a stretch of loose shifting chips of rock while near the bottom are numerous boulders, some of gigantic proportions, under and between which are cavities in which the Guillemots nest. As one approaches this rookery many of the birds are seen sitting upright, softly "whistling," but upon close approach those on the rocks take wing while their mates flutter from among the rocks and join them. Then by a careful search of promising looking cavities one may secure a nice series. These eggs are to my mind the handsomest of any of the Farallone eggs. In a series before me are several types. Some have a bluish-green ground color, intensely blotched with dark brown especially about the large end with delicate markings of lilac throughout. Others are evenly spotted with small dots of cinnamon-brown and lilac. Again another type has yellowish ground with light-brown splashes and lilac-gray, while a third set is plain bluish-white.

Two eggs usually constitute a set but in a number of cases one egg was found badly incubated. No nest is constructed in which to deposit the eggs but almost invariably the eggs repose upon a collection of small granite chips or pebbles gathered by the birds. Both birds assist at incubation, and I have a male bird taken with a set of two eggs. The rookery described is not near the ocean but many of the Guillemots nest in holes in the cliffs above the sea. At any time groups of birds may be seen gathered on the

rocks near the surf. I have noticed young ones so close to the water that the spent force of a "roller" would almost wash them away. The young Guillemots are pretty, fluffy, black little fellows but they usually keep hidden beneath the rocks for they seem to inherit that instinct which warns them against exposing themselves to the cannibalistic Gull.

We come now to the rare Ashy Petrel (*Oceanodroma Homochroa*) which I treated at length in the *Nidiologist* for August, 1894 and which I will not repeat. They nest throughout the island preferably beneath stone piles on the ground. They fly about only at night. One egg is laid which is of a creamy white color both before and after being blown. It is usually but very faintly spotted about the large end and often wholly unmarked. I have but one egg which is well marked and it has a wreath about the large end composed of irregular dots of light reddish-brown. The eggs of this Petrel average considerably smaller than those of Leache's. The measurements of seven eggs are as follows, the extreme sizes being given first: 1.06x.89, 1.22x.89, 1.20x.89, 1.20x.87, 1.19x.86, 1.13x.89 and 1.11x.87 inches.

When one is tired of scaling the cliffs it is indeed restful to study the sprightly little Rock Wren (*Salpinctes obsoletus*) as he flits about among the rocks. The island in general is an admirable place for a bird of its habits. At almost any time during the day the beautiful, liquid song of the Wren may be heard from out the barren stone piles as he busily seeks his food. The nesting habits of this bird are most interesting. The nests are built generally in some deep crevice in the stone walls

which extend over portions of the island. They are composed of fine shreds of farallone weed matted together, with a few feathers intermixed in some cases. One nest at hand is lined with horse and goat's hair. They average three inches in diameter and are loose affairs as a rule.

The nests being concealed in the stone walls are very hard to discover. I was most successful by walking along the walls and watching closely the crevices from which a bird would fly. In the middle of June but two sets of fresh eggs were found, but several nests were discovered containing incubated eggs and small young birds. In one place the young were learning to fly. I am informed that the Wrens begin nesting late in April or early in May and I have two sets of eggs taken in August, from which I infer that probably three broods are raised in a season. The habit of paving the entrance to the nest with chips of rock, bleached bones, etc., is well known. Mr. W. Otto Emerson of Haywards, Cal., who has collected extensively on the islands has a nest with its "ornaments" which is most interesting. Six or seven eggs constitute a set early in the year, but the late sets consist of five or six usually.

These constitute the breeding birds, although the American Raven (*Corvus corax sinuatus*) is present on the island and a pair have a nest on an inaccessible cliff, but no one has thus far succeeded in securing the eggs. In June a few Black Turnstones were seen on the rocks near the surf, and Mr. Osgood noted a Yellow Warbler. In winter and spring numerous land birds are noted about the island

and Hawks prey on the Murres to a considerabe extent*

When the time came for us to take leave of the island, in justice to the benevolence of our host, we partook heartily of the feast of boiled Murre's eggs, a delicacy of which those of the "Far East" know not the delights! The penalty was paid later when we set sail in a small fishing boat for "land" and after seven and a half hours' on the briny deep the lights of the metropolis hove in sight and our enjoyment and miseries alike were at an end.

Natural Preservation of Leaves, Ferns, and other Vegetable and Animal Remains.

J. HOBART EGBERT, A. M., M. D. Ph. D.

During a recent trip through southwestern Missouri the writer found a most interesting deposit of calcareous tufa and secured a number of beautiful specimens. Calcareous tufa is a rather widely diffused mineral owing to the large number of calcareous springs—in the neighborhood of which it is most frequently found. A description of the deposit in question may serve as an interesting key to similar mineral formations and also render the explanation of our observations and analysis more entertaining.

Well up in the mountains of Cedar Co., Missouri, near the border of Polk Co. we found an insignificant little spring, the water of which after reaching the surface incrusts animal and vegetable remains and congeals masses of dried leaves and other debris over which it flows, into a stoney mass.

* "Birds and Eggs From the Farallone Islands," by Walter F. Bryant.

The water emanating from the spring flows down a steep incline and seems to make its most abundant mineral deposit about twenty-five feet from the spring. The process of incrustation takes place quite rapidly—it simply being necessary for a bunch of dried leaves, or other vegetable or animal debris, to remain in a pool of the water or in the current of its flow a few months ere the entire mass is solidified—each particle of vegetation, etc. entering into the mass, preserving its characteristic form and outline. The process, as I observed it at intervals during a period of five weeks on a selected bunch of dried leaves, begins by a slimy deposit on the surface of the dried vegetation, which deposit continues to increase in size and density until each leaf is well preserved in a hard and somewhat thickened condition—its outline being maintained, even to minute detail. All leaves and debris that remain in the water-course—which has no definite boundaries but spreads out over the hard soil of the mountain side—are likewise treated and those that are collected in masses become united together by a spongy deposit which ultimately dries and hardens. Thus in a single mass one may find leaves of all the trees common to the vicinity oak, ash, sycamore, etc.; also ferns, broken twigs, and feathers of birds.

As already mentioned this mineral deposit is known to geologists as calcareous tufa or tufaceous limestone. In composition it is nearly identical with common limestone and marble, but is distinguished by its spongy and porous structure. A careful examination of the deposit we have just described shows it to consist almost entirely of carbonate of lime, with a

small amount of clay. It contains neither magnesia nor iron except such as exist in the clay or foreign material. The carbonate of lime is deposited from the water of the spring after its carbonic acid gas is liberated, and the process of incrustation is accelerated by the spreading out of the water after reaching the surface of the ground and by the rays of the sun which play upon the mountain on this, its southeastern exposure, during most of the day. The water of the spring is what is known as "a moderately hard lime water," is clear and sweet, and not objectionable for drinking purposes.

In this part of Missouri—the southwestern—both the student of Natural Science and the collector of curios may find much to interest and instruct.

Indian relics are still to be found in considerable variety and numbers. In the district in question one may quite easily obtain quantities of arrow heads, spear-points, stone knives, fragments of pottery, etc. On one small hill, or mound, about eight miles east of the spring just described, we found a veritable arrow-head factory. In the surface soil of this hill, white flint is very abundant and may be found in all sizes from huge rocks down to fine chips. On top the ground the chips are especially numerous and upon inspecting these somewhat closely it was found that many of them had been worked into special forms. In fact, pieces of Indian arrow-heads were strewn all over the hill. Tips, butts, barbs, half-made heads, etc., could be picked up in numbers, but only a few unbroken and well-formed specimens were found. Imperfect spear points and fragments of other stone implements were also taken from the hills. From the abun-

dance of these imperfect specimens and the dearth of good ones—as well as from the evidence of stone-working as manifested by the innumerable small flint chips—it is reasonable to conclude that this was a favorite spot for the manufacture of stone weapons by a race of people now almost extinct. The place is most favorable for camping. Just north of this hill rises another and between the two flows a beautiful stream of clear spring water. The space between the foot of the hills has, in places, a width of about 300 yards, in others, not more than 50 feet. This narrow valley with its trees and verdant grasses probably furnished the ground upon which the wigwams were pitched. Here the old men and young braves doubtless fashioned the hunting and war arrows and spears for the hunters and warriors of the tribe.

Numerous Indian graves have been found on the adjoining hillside.

118 South St., Holyoke, Mass.

A Shell Hunt Forty Feet Under The Sea.

C. HEDLEY, SYDNEY, AUSTRALIA.

To widen the fairway of Port Jackson (Australia), a submarine reef is being removed. An opportunity of going down with the divers employed thereon was kindly offered to myself and a scientific friend by the officer in charge of the operations. So tempting an invitation was, of course, accepted with delight. Often in imagination had we wandered on the ocean floor, peering into ghastly wrecks of ships sunk long ago, fighting with some huge shark or monstrous octopus, and gathering treasures of science or heaps of

gold. Now our dreams were to come true and we were indeed to tread that fairy-land. We might not have the luck of the mariner in the song who

"Fell overboard in a gale,
And found down below where the seaweeds
grow,
Such a lovely maid with a tail,"

but we should certainly pluck strange growths at the bottom of the sea as one might pick flowers in a meadow.

A trim launch sped with us from Circular Quay down the famous Sydney Harbor, past bay after bay, some lined with wharves and shipping and some with trees growing to the water's edge, by rocks and white sandy beaches, past point and headland gay with villas and gardens, or sombre with eucalypt forest. So familiar was the scene to us, that we smoked and chatted, unmindful of its beauties, till we reached a flotilla of punts and barges moored near the Heads.

After a cup of tea with the overseer, we prepared for our descent by divesting ourselves of boots, coat, vest and collar. A couple of laborers officiated as my *valets de chambre*, wrapping me first in thick flannel socks, trousers and jacket, and then in a canvas overall garment which left only the head and hands uncovered. The hands being left bare, the sleeves were secured at the wrists by rubber cuffe and bracelets. My feet were thrust into a pair of enormous boots, each sole of which was weighted with 25 pounds of lead. Bending my head, two men placed over it a huge diver's helmet and screwed it into a brass collar of the canvas dress. My costume completed by slinging on chest and back two large metal weights, I was told to rise. Thus encumbered, it was no slight ex-

ertion to get up, take three steps to the ladder, and descend into the water knee deep. There I halted while my signal cord was belted round my waist; my air-tube, which reminds me of a garden hose, was screwed to my helmet and the pump commenced to force air through it. Finally an attendant screwed a plate-glass front, the size of of a saucer, into my helmet; from the inside, this last operation resembled the closing of a coffin-lid. Some one tapped my helmet twice, the submarine single for "all's well," and I started.

Stepping off the bottom round of the short ladder, down I went, till the keel of the barge loomed up, rose and passed me—down, down into the green sea water, watching the silvery bubbles stream upward—down, down, down, as the water darkened. That sensation of gliding down into an emerald abyss, was the weirdest, dreamiest thing I ever felt. Then so gently did I alight, that I merely noticed that I had ceased to fall. At my feet I saw rock and sand and seaweed; looking up I saw a monster in a helmet with two ropes leading away upto where the sky ought to be. The monster's face showed through the little window as a big fair mustache and a pair of kindly blue eyes. Fetching out of a capacious trouser pocket a small school slate he wrote, "How do you feel? Shall we go on?" and held it up. Taking his slate, I wrote, "First rate; go on." He read the message, gravely rubbed the slate clean with his finger, pocketed it, and held out his hand. I grasped it and we started for a walk at the bottom of the sea.

Then I noticed a pain in my ears: the compressed air was hurting me.

To cure it, I went through the motion of swallowing once or twice. Feeling more comfortable, I "began to take notice," as they say of the babies. The light was bright enough to see small things plainly twenty feet away, but the water strangely magnified familiar objects. A shoal of little fish passed us, swimming under our arms and between our legs in the most ridiculous way. I tried to take one with my hand, but it deftly turned and avoided my grasp. The guide, seeing my attempt, pinned one to the ground with an iron rod he carried, and handed it to me; another he stabbed and caught as it swam by. Before we had gone far I had lost all sense of time, space or direction, and became too confused to know whether I had travelled east or west, ten yards or a hundred, in ten minutes or half an hour. A queer sensation was that of having escaped from the law of gravity; it seemed just as easy to walk up as down a cliff—we usually walked on our toes, sloping from the ground at an angle of forty to sixty degrees. When too much air is pumped down, the submarine pedestrian is unduly buoyant, and his aims to clutch a shell from the ground must be comically like the dodging and staggering of a drunken man.

A little dell lay before us choked with rank seaweed, through which we strode waist deep like plunging into a tangle of fern in some damp valley on the land. My guide reached out, picked something off a broad frond, and handed it to me. It was a *Doris*, a lovely creature, whose like I never saw in books, striped with purple on a milk-white ground. It began to crawl over my fingers quite unconcernedly.

I clapped my hands and tried dumbly to express my delight by patting my companion's big fist. He replied by offering me the slate, on which I wrote "Very good; put him in the bottle." Rubbing out my words, he wrote, "Send down the bottle," tied the slate to the rope and jerked the latter four times. Away went rope and slate to the regions above. In response to an answering signal the slack was hauled in and my collecting-jar descended tied to the rope. In turn, we tried in vain to open it. Although our correspondents above had filled the bottle with water, the pressure at our depth so sealed it that we could not raise the stopper. With a message on the slate, "Open this bottle and send it down open," we sent the jar aloft. When it was lowered to us the second time, I found that my *Doris* had slipped unobserved through my fingers, and so I lost a possible new species, the rarest treasure I was to see that day.

Continuing our travels in the dim water-world, we passed through a field of sponges. Not the brown, round masses of the bath-room, but radiant growths of scarlet (*Raphyrus hixonii* and *Halicondria rubra*) and purple, here and there great open oscula, tempting one to poke in a mischievous finger. Some grew in tufts like moss, some expanded like a dainty vase (*Phyllosiphonia caliciformis*), some forked like branches of trees and some spread like a lady's fan. One abundant species, about the size and shape of an orange, was pure ice-white, studded with golden dots that almost glittered (*Leucondra* sp.). Of all these we gathered what we could, pricking our hands sore with sponge spicules as we worked. When, on the morrow, our ravished

beauties lay dead on a table in the museum, they had faded sadly from their pristine splendor. Among the sponges grew purple *Boltenia pachydermatina*, a pear-shaped head upon a slender stalk, like tulips in an earthly garden.

For a surprise, the diver held up before my face and pressed an *Aplysia*. From it flowed a violet stream which stained the water for two feet around, hiding hand and mollusk in the cloud. One of my last captures was an exquisite nudibranch, which swarmed on the broad fucus blades. In hue it was the blue of a summer sky, flecked with blood-red dots and stripes. I had now grown weary; not of searching for wonders, but of supporting the heavy diving armor, and was content to be drawn up again to the world of air and sunshine, which I had quitted three-quarters of an hour before.

On reflection, I found the reward of my under-water foray to be, not a hoard of specimens, but a better appreciation of the circumstances under which marine life exists. Our party of four had only observed, dead or alive, *Chamostrea albida*, *Vola sumata*, *Trigonia lamarcki*, *Struthiolaria scutulata*, *Drillia oweni*, *Cassis pyrum*, *Cypraea xanthodon*, *Astralium tentoriforme*, *Ranella leucostoma*, *Aplysia kraudreni*, *Chromodoris bennetti*, and two undetermined *Doris*. Molluscan life seemed, on the spot I explored, to be less plentiful than at low-tide mark. Perhaps, however, the difficulties under which I labored as a beginner in the art of diving, impeded me from finding what was really there. After seeing the rough sea floor, one wonders that a dredge should capture as much as it does. A rich harvest probably awaits a conchologist who

should seriously practice diving as a means of collecting.—*Nautilus*.

The Hermit Crab.

This very curious little animal is one that always attracts attention when one visits the sea shore. Not unfrequently is he found occupying a fresh "live" (?) shell showing that he has attacked and killed the Mollusk. To watch one crawling along the beach dragging the shell after them, is indeed a curious sight. They are most commonly found in the Naticas which line the Atlantic shore. Their structure is not unlike the common crawfish or fresh water crabs. The legs and feelers are always attached to the forward half of the animal, being the body proper. The jointed portion behind is called the abdomen. The head is a part of the body proper and is not separate from it as in the case of insects, etc. The abdomen portion is soft and has no trace of the hardened parts as in the case of the lobster. It can be readily seen that as this portion of the body has no means of protection it would be but natural for the animal to inhabit some of the shells cast upon the beach. Its structure enables it to hold onto the shell easily but as the shell has no power of growth the crab from time to time has to vacate and secure new quarters.

Congratulations.

WALTER F. WEBB, Esq., Publisher, Albion, N. Y.

My Dear Sir:—Your first number of the "MUSEUM" received, and I congratulate you most heartily. It is just what we naturalists of the East have needed for a long time. Enclosed please find one dollar for one year's subscription. Wishing you great success in your venture, I am,

Very sincerely yours,
FRED W. PARKHURST, Atty at Law.

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A Monthly Magazine devoted to Ornithology, Oology, Mollusca, Echinodermata, Mineralogy and Allied Sciences.

Walter F. Webb, Editor and Pub'r,
Albion, N. Y.

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Make articles as brief as possible and as free from technical terms as the subjects will allow. All letters will be promptly answered.

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WALTER F. WEBB,
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NOTES.

We learn through the *Batavia News* of our own county, of the capture of a Golden Eagle alive in a brush heap near that place. The bird seemed dazed and was evidently sick as it was easily caught but died during the night.

One of the most interesting exhibits we had the pleasure of seeing in the Mines and Mining building at the World's Fair was that of Mr. A. B. Crim, Middleville, N. Y. It was of the noted Herkimer Co. Quartz Crystals. The case contained over 14,000 in all the varied forms in which they are found. His ad. will be seen in this number of the MUSEUM.

Philadelphia collectors and those nearby should not fail to see the collection of minerals, relics, etc., now on exhibition at John Wanamaker's. It embraces a particularly fine lot of Crystallized minerals, especially Calcites and Barites, and a large number of polished Agates, Opals, etc. Two cases of stuffed birds, two of shells, and a variety of fossils and corals are in the same exhibit, which is well worthy several hours examination.

We have a very interesting letter from J. L. Davison, the Naturalist at Lockport, N. Y. Mr. Davison has been sojourning up in the northern part of New York and reports finding some very fine pockets of the rare Capped Quartz. Also a fine lot of Iceland Spar, Tourmaline, Tremolite, and parties desiring any of these had better write him, or address us and we will see the matter has attention.

Needed.

MR. W. F. WEBB.

Dear Sir:—Have received the first number of your MUSEUM, and am very well pleased with it. We have long needed it in the East. Please allow me space in your magazine to remark, in connection with that Whip-poor-will article, that a friend of mine once saw a Nighthawk remove a single egg from the roof of a mill by means of its mouth. It had been frequently disturbed.

Fraternally,
ARTHUR M. FARMER.

Well Pleased.

MR. WALTER F. WEBB.

Dear Sir:—No. 1 Vol. 1 of "MUSEUM" at hand today. Am so pleased therewith I enclose post-office money order for \$1.25 for which please send it to me regularly for a year, and renew my exchange notice in Dec. number as printed in present number.

W. E. SNYDER, Naturalist.

Bird Egging "Down Along."

Editor Museum.

Dear Sir. I suppose that really, without intending it, I have become a veteran in affairs relating to that region so little known, to any of us in fact, called on your maps by the mysterious name of *Labrador*.

I called it a *mysterious* name for various reasons. The French call it *La Bras d'or*, "the golden arm" or "the arm of gold" as stated in the November MUSEUM. Some of the explorers came over and loaded a vessel with those glittering flakes of *mica*, and the iron pyrites vulgarly known as "fools' gold," and returned with their valuable (?) cargo and any amount of stories of the wealth of the "New-found-land!" The Basque named it from a Basque whaler who supposedly discovered it, named *Labrador*. The Spanish named it from the word signifying a *laborer*, *Labrador*, or "one who lives in a small village."

Now whatever be the correct derivation of the word the natives have a very quick way of getting over the matter. If you ask at almost any point from Mingan, or in fact from Quebec itself, to Ungava Bay where you are going when you go, presumably, to *Labrador*, they reply "oh, Down Along!" What may mean almost any place along the area of coast mentioned.

Well, the editor has suggested that perhaps his readers would like to hear of some of my successes in egging in this same region of "Down Along!"

In the year of 1881 I had what I then called phenomenal success in this same pursuit.

I started from Quebec thoroughly

equipped for a good time, and I had it.

My first stop was at Mingan, and off the islands near that place I found nineteen varieties of sea birds breeding in abundance. I do not know as they breed there now anything like they did then; but I believe that there are still many good places on those same islands where I could even now collect, in a day, from a dozen to fifteen kinds and a good many of each. Such birds as the Eider Duck, Black-backed Gull, Herring Gull, Razor-billed Auk, Puffin, Black Guillemot and Foolish Guillemot, could be found anywhere, almost, that we were a mind to look for them. We used to eat these eggs, and I have often collected a bushel basketful in less than half an hour. In fifty places between Mingan and the island of Bell Isle I have done the same thing. They were so common that we thought nothing at all of it. These were the common kinds, that needed no hunting after. After these then there were the uncommon kinds.

By the ponds back a little in the interior we found the Black Duck with her brood, the Wood Duck sometimes, the Long-tailed Duck or "South Southerly" and what we called the "Scrater" Ducks' nests. The "First Ducks," we were seldom lucky enough to shoot and identify positively the species. So I refrained from adding many a probably valued find to my list. The Loon's eggs were found, the Grebes' also, on many an occasion. The Red-throated Diver and the Common Diver used to puzzle us, unless we could shoot the bird on or near the nest, which we did oc-

casionally. The Grebe was called there the Wabby, and rather rare, but they were sometimes taken. Rarely what we supposed were Teal Ducks nests and eggs were found,—but we were never certain of the species. In the straits of Belle Isle the King Eider's nest was found several times. Five to six species of small Gulls and Terns, but the birds did not always let us identify them. When the eggs themselves were distinctive it was easy enough.

The cut of the end of Greenly Island in your last number, gives a very imperfect idea of the place. No one would imagine that there was soil enough for the birds to burrow from eighteen inches to two feet deep. But the picture represents a shadow picture, and in the relief of the shadow the burrows were so thick that a board a foot square could hardly be

put on the ground, within the area of some three to four acres of land, without covering at least part of one or more burrows.

I do not wish or mean to make this an "advertising dodge." I may never visit this place again: where I have had so much sport; shooting birds by the hundreds, collecting eggs by the thousands, and fishing for trout at the rate of five hundred a day, and selling them at fifteen dollars a barrel (salted) and clearing a good handsome profit at that—but I would like to take a company of ten nice fellows who would put in \$100 apiece, from Quebec to Belle Isle or beyond and return. I would start June 1 and return August 1. I would go equiped for all sorts of investigation, especially Geology. I want to study the Geology of this region.

I send you a beautiful picture of gla-



Morain at the terminus of a glacier situated where the glacier entered the ocean.
Eight miles west of the Eskimo River mouth.

cial terminal moraine at the bottom of Old Fort Bay, seven miles in the interior.

The hills above have a height of

from 300 to 500 feet above the sea. The ridge between the sea, and the lakes and valley beyond is as smooth and even as if cut by "sail and compass."

Back in the country the lay of the glacier is evident and very decided. Three lakes form the resting places of the last of the ice. The slide down the bank was smooth as a planed floor and a splendid coasting place in winter. I have coasted over fifteen feet of snow there often. This was one of several arms of a larger arm of what, with the discoverer's and first describer's license, I call the Fort Island Glacier, because I believe that Old Fort Bay was mainly scooped out by this glacier for a distance of four miles, and that the ice went to pieces just this side of the before mentioned island. The moraine in the picture was evidently a *recision* moraine. Another glacial arm occurred at Chateau Bay, still another near Battle Harbor. At Blanc Sablon and a little north occurred the *Roaches Moutonuies*, or "Mutton, beetle, billow rocks" as they are called. I judge that the shallowness of the Straits of Belle Isle is owing, in great part, to the immense amount of glacial and iceberg debris hurled or dropped into it from time immemorial. But this is not hunting birds' eggs.

One reason why egg hunters are not more successful in this region is because they do not go to work the right way to make their finds.

To be successful one must become acquainted with a good natured, intelligent and competent guide, and let him pilot you into the interior and tell you what to do, where to go, and then you with your previous intuitive knowledge of your wants, go and show him how to do the hunting up of nests. There are plenty of good finds to reward the diligent hunter. And I believe that many more than is gener-

ally expected. May and June are the months. Take a boat and go all up and down the coast, in and out the bays and harbors, among the cliffs and crags.

Who likes dredging? I have many a time promised myself a trip for this one object alone. Insects, lichens and even the generality of shallow sea animals have been scarcely touched as to collection. Fossils are plenty in many a locality. All this along shore simply. The interior is a "new" collecting ground. If you can fight the black flies, (the *marin gouins* I believe the French word for them is) your visit will be well rewarded. A windy day is the only time to go inland. If the wind dies down and finds you there, I pity you, if your experience is at all as mine was.

If we found the young of Wilson's Black Cap then why not find the nest and eggs? The Hudson Bay Titmouse likewise. So also with the Pine Grosbeak, Rusty Blackbird, Canada Jay. Several of the Thrush family, the Longspurs and Snow Buntings, and a host of other summer residents that I know breed there.

If your Editor had copied my description of the Hudsonian Chickadee, or the Horned Lark, or the Redpoll Linnet, or the Snow Bunting I believe it would have inspired some one to do some thing. It always fires me even now to sit calmly down and read those, or any one of those, four articles. It recalls so vividly the pictures of pleasant waters, calm serenity, and the exuberant gladness of mere existence, that it makes me lonesome. I arise from my chair and put together my double-barrel L. C. Smith, or take from its case my 22 Winchester re-

peater, and for about half an hour the air grows so sulphurous that it would be even dangerous for a bird to even think of existing any where within the company of a "possible shot."

The little pamphlet I published entitled "Bird Life in Labrador" tells a great deal about the birds of this re-

gion, and has interested a great many readers. I feel prouder of it than of anything that I ever wrote. That and the other entitled "Notes on the Natural History of Labrador" will tell you nearly all that is known of the Natural History of this region. If I do say so!



Glacier Pass, Near Chateau.

Now I will close with another picture of another glacial pass in still another place. Our camera was faulty and our pictures were and are very poor, but they will serve to show you, a little of what sort of a thing we were constantly meeting with, and how full of interest were the places we did visit in this mysterious region. Such glacial passes were abundant in nearly every bay or harbor, and we could have taken views of hundreds of them had we possessed good cameras and developed our pictures at home.

Great Success.

My ad. in the Nov. issue has been a great success in your paper so far. Replies are coming in from all parts of the country.

C. M. HATFIELD, So. Pasadena, Calif.

Arctic Notes

On the Habits of Certain Rare Northern Birds in Commander Islands and Kamtschatka by Leonhard Stejneger.

Taken from his Excellent Report to the U. S. National Museum.

PALLAS'S MURRE, *Uria lomvia arra*.

The "Are," a Russian name derived from the voice of the bird, is extremely abundant at the Commander Islands, and is perhaps at present the most numerous species of the region, although it is difficult to say whether the Tufted Puffin, *Lunda cirrhata* is not just as rich in individuals. The largest rookeries are situated on Copper island. They pass the winter away from the shores of the islands, probably on the open sea not far from them, as is indicated by living individ-

uals occasionally appearing during the winter and dead bodies regularly cast ashore after each severe storm of that season. About the 1st of April, or a little earlier, their enormous flocks approach the shore and take possession of the rookeries. When breeding, the long rows of "Ares" on the narrow shelves of rock where they have deposited their many-colored, large, pear-shaped eggs, face the rocky wall with their white breasts, turning their black backs to the spectators. When flying off their nest they consequently are compelled to first turn around, and if taken by surprise, their maneuver will often cause them to throw the egg from the shelf into the water.

It happened several times when I stealthily approached in a boat under the breeding colonies, that several eggs were thrown into the boat when the birds rushed off the nests, (if the bare rock upon which the egg is placed can be called a nest,) and my Aleutian oarsmen were always in a roar of laughter when one of these projectiles exploded on the head of an unfortunate comrade. A series of eggs of all shades, from white to deep greenish blue, are collected, and measure from 79 to 84 mm long by 48 to 53 mm wide.

WHISKERED AUKLET, *Simorrhynchus pygmaeus.*

This little Auklet, certainly the prettiest of the whole family, has its favorite home on the steep, rocky shores of Copper Island, but may be found breeding all along the coast where suitable holes and crevices occur. I also found nesting places, near some of the main villages. Notwithstanding the fact that the birds are rather common it must be considered

good luck to meet them and get opportunity of observing them, for they are rather shy and live quite retired in their deep holes. They are such early breeders, being considerably ahead of their allies. In fact so early that no eggs could be procured the latter part of June when I had opportunity of going after them. The nests at this time contained young, which remain in the nest until full grown. On July 18th a young bird was found early in the morning, concealed in a fold of the sails, the inexperienced youth having probably mistaken it for a crevice of rock. When the breeding season is over they all retire to the ocean.

PAROQUET AUKLET, *Cyclorrhynchus psittaculus.*

This species arrives in the islands about the end of April. The best time to observe them is about 4 o'clock in the morning and also at the same hour in the afternoon as the rest of the day before the breeding has begun, is passed away out at sea, and after that time in the deep holes of the rock in which the nests are located. At the time mentioned they may be seen sitting in pairs on the rocky ledge outside of the nest cave. Their voice is a clear vibrating whistle.

HORNED PUFFIN, *Fratercula Corniculata.*

Not very common on the islands as compared with the Tufted Puffin, *Lunda cirrhata*, probably because suitable breeding places are scarce as they require rather deep holes in rocks or between stones. A few pairs, or where the locality offers more nesting opportunities, some small colonies are found scattered among the rookeries of the

other water birds, sometimes higher, sometimes lower than the other species, sometimes in the midst of them according to where the holes and cracks in the rocks are situated. The nest-holes are found in the rocks and I never saw a single pair breeding in a hole dug out of the soft ground as is usually the case with other Puffins.

GLAUCOUS-WINGED GULL, *Larus glaucescens*.

This species breeds on the various islands but most numerons all along the shore of Copper island. The immense colonies are quite frequently on inaccessible rocks overlooking the sea. Eggs were found as early as May 16th and measure 73x54 mm. Compared with the eggs of the Glaucaus Gull, *Larus glaucus*, those collected by me show a just perceptibly more greenish tinge and somewhat smaller, more numerous and better defined spots.

SLATY-BACKED GULL, *Larus schistisagus*.

Not found on the islands to any great extent. On the 20th of April I observed them for the first time in company with the Glaucaus Gulls on the eastern shore of Bering Island. From the inhabitants I learned that this bird breeds at Babuschkin Kamen in the bay of Avatscha, and on Staritskof island, south of the entrance to that bay.

PACIFIC KITTIWAKE, *Rissa atridactyla pollicaris*.

This is a common breeding bird on the islands but as all places do not suit this noisy bird, the rookeries are comparatively few, a compensation for which is found in astonishing num-

ber of individuals inhabiting each rookery. For such are chosen steep walls, rising perpendicularly out of the deep sea, and especially high pinnacles standing lonely, amidst the foaming breakers, provided they are fitted out with shelves and projections upon which to place the nests. As Copper island offers such localities all around its shore, the Pacific Kittiwake is pretty well distributed all over that island. They arrive about the first of April and I found the first young hatched on August 2nd.

RED-LEG KITTIWAKE, *Rissa brevirostris*.

This species is in every respect, both structurally and in its habits, a true *Rissa*. Like its black-legged cousin, it only selects steep and inaccessible rocks, and in none of its habits at the breeding place could I detect any marked difference. They arrive at the islands about the same time, hatching their young simultaneously with the other species. Those birds not engaged in breeding do not seem to straggle around to such an extent, as do the black-legged ones. The two species usually keep apart from each other but in one place I found them breeding together, on a rocky wall, the black-feet however always higher up than the present species. The two kinds were easily distinguished even on the nests, *brevirostris* having the gray of the mantle of a perceptibly darker shade than *pollicaris*.

PARASITIC JÄGER, *Stercorarius parasiticus*.

On the islands the dark form is the most common. A few only with low-

er surface were seen, and one secured. This species is found mostly on Bering Island where it breeds on the great tundra, or rather swamp, near the village. The first birds made their appearance on the 4th of May. One egg was collected May 29th and measures 57×41.25 mm.

SHORT-TAILED ALBATROSS, *Diomedea albatrus.*

This bird is by no means a rare visitor to the islands, where I never saw *D. nigripes*, a species which, on our northward voyage from San Francisco, left us before we reached the Aleutian chain. They were first observed the middle of March. These were the old birds in the white plumage, and on April 14th not less than eight were seen near the village. During the summer, however, the black young birds of the foregoing year are more numerous. In the middle of the immense flock of Puffins and Auks, covering many acres, can always be seen one or two of the comparatively gigantic birds, which however are the first to take the wing on approach of a boat.

PACIFIC FULMAR, *Fulmarus glacialis glupischa.*

The "Glupisch" is one of the commonest summer visitors to the islands and breeds in enormous numbers in suitable places, that is to say in high and steep rocky bluffs and promontories boldly rising out of the sea 300 to 800 feet high, and I have spent hours under their rookeries listening to their whinnying voice and watching their high and elegant flight in sailing out and in and around the cracked rocks like bees at an immense bee-hive. The Fulmar is the first one of the non-

resident water-birds to arrive at the rookeries in early spring, usually in March. The order of arrival being *Fulmarus*, *Uria arra*, *Lunda coryphata*, *Fratercula corniculata*. The eggs are dull white without spots and measure 68 to 71.5 mm by 48 to 51 wide. One specimen measured 75x49 mm. All were collected on July 12th and 13th.

FORK-TAILED PETREL, *Oceanodroma furcata.*

This bird breeds on Copper Island, where it is known by the natives as "Sturmofka." On July 12th I visited the precipitous rocks of Tschornij Mys, where a small colony of these graceful birds were breeding. The eggs, a single one in each nest, were deposited in deep holes in the steep basaltic rocks, 3 feet or more deep and was only with great difficulty that a few could be secured. The birds were taken on the nests and in some the females, in others, the males were sitting. The eggs which were in different stages of incubation, are white without gloss. Some have the minutest dark specks evenly dusted over the blunt end, in others these specks are a little larger, purplish black, and form a circlet around the blunt end, while some few lilac spots shine through from the deeper layers. The eggs were collected July 12th and measure 32.5 to 34 mm long by 25 to 26.5 mm wide.

TURNSTONE, *Arenaria interpres.*

It makes its appearance early in May and the beach especially on the north shore of Behring Island fairly swarms with them. In June they disappear and only a few remain during the summer. These, I suppose to

breed although I did not succeed in finding any of their nests. However as early as the latter part of July even larger flocks than those seen in the spring return from the north. From this time until late in autumn enormous masses of them may be seen on the killing grounds, near the seal rookeries, where thousands of putrified carcasses of the slain fur-seals swarm with myriads of the white larvae of the flesh-fly, upon which the pretty Turnstones feed and grow exceedingly fat. At sunset they retire to the beach, where they pass the night, not however without having a soldier-like drill by flying up and down the endless tundra, now in full body, now again in detached divisions, and with admirable precision turning and maneuvering as if obeying the command of a leading officer.

PACIFIC GOLDEN PLOVER, *Charadrius dominicus fulvus.*

This form is distinguished from its near American relative *Ch. dominicus* which also has the axillaries smoky gray, by the greater brightness of the yellow color. The Pacific Plover is, however, the form which occurs most commonly in Alaska, occupying the whole shore of Bering Sea, while the true *dominicus* only breeds in the interior and along the coast of the Arctic Ocean. The individuals of *fulvus* breeding in America migrate in winter along the Asiatic Coasts, thus giving evidence of the way in which the species once immigrated into Alaska. They arrive about the middle of May, coming again after the 15th of September.

MONGOLIAN PLOVER, *Aegialitis mongola.*

One of the brightest and handsomest of the shore birds and always gladly welcomed when making its appearance during the first half of May. While at Glinka on Copper Island, in July, 1883 a young bird of this species not yet fully feathered was brought to me alive. Allowed to run free on the floor it immediately commenced a very animated pursuit of the rather numerous flies which were caught with remarkable precision and rapidity and devoured with an unsatiable appetite. The little fellow did not pay any attention to the presence of several persons in the room, but when the dog rose from his nap in the corner, the swiftfooted fly-killer suddenly dropped flat on the floor, with withdrawn neck, making himself as small and flat as possible, and remained there perfectly immovable until the dog turned his head the other way, when he ran off to the darkest corner of the room, where he remained until the former laid down in his old place. Then he started the fly hunting again; the dog rose once more, and the same performance was repeated. Within half an hour, however, he had learned that the dog did not take any notice of him whatever, and consequently he afterwards paid as little attention to dog as to man. A nest was found on the islet Toporkof, on the 4th of June and contained three eggs. They were lying with their pointed ends inwards and downwards, in a slight hollow in the ground between the stems of four *Angelica archangelica*. Dry particles of the leaves and stems of this plant, and numerous seeds of

the same, formed the nest, being evidently brought together by the bird itself. The situation of the nest was about 40 feet from the line of high water, and about 14 feet above the level of the sea. One of the eggs was quite clear; the second contained a small embryo, in which only the large eyes were distinguishable; the third had a larger foetus with well-developed wings, legs, etc. In general appearance the eggs recall those of *Acgralitis semipalmata-almata*, being larger, however, and of a somewhat deeper ground color. Some eggs were more olive and others more buff. The spots are on the whole smaller than in average specimens of the former, being in that respect more like *Ac. heaticula*. The eggs measure from 36 to 37.25 mm long by 26.5 to 27mm wide.

ALEUTIAN SANDPIPER, *Tringa couesi*.

The Aleutian Sandpiper is a perfectly good and distinct species, readily distinguished in all plumages from the Purple Sandpiper, *Tringa maritima*, with which it has frequently been confounded. The first eggs are laid about the middle of May. On the 17th of June I got a newly hatched chick. Like so many other members of the same order, the mother shows great love for her offspring, trying all sorts of devices to divert the attention of the approaching hunter from the young ones to herself, risking her own life in order to save theirs.

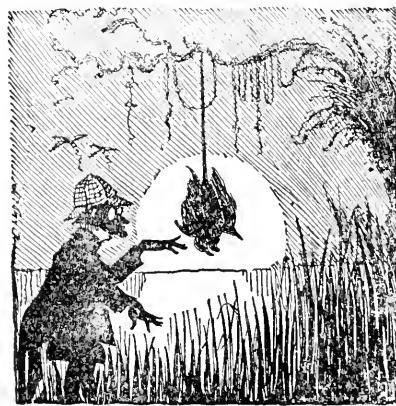
LONG-TOED STINT, *Tringa damaccensis*

This species arrives at Behring Island in large flocks during the later part of May, and are then met with on sandy beaches, where the surf has thrown up large masses of sea weed,

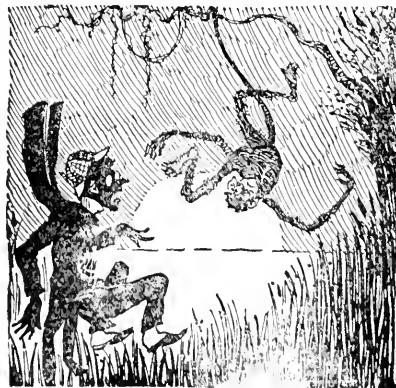
busily engaged in picking up the numerous *Crustaceans*, etc., with which the weeds abound. Most of the birds stay only a few days, going further north, while a small number remain over summer, breeding sparingly on the large swamp behind the village. My efforts to find the nest were unsuccessful but I shot birds near Zapornaja Reschka on the 17th and 22nd of June, and on the 7th of August.

[CONTINUED IN JANUARY NUMBER.]

A Naturalist's Mistake.



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We regret that we are obliged to leave the article on Pacific Coast Starfishes out of this number but it will surely appear in the January number.

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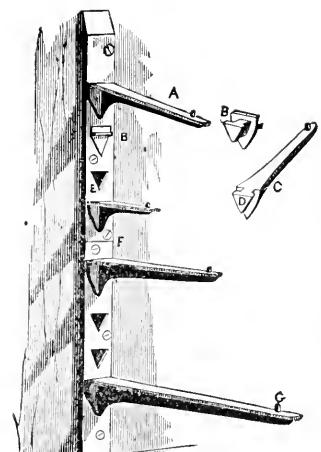


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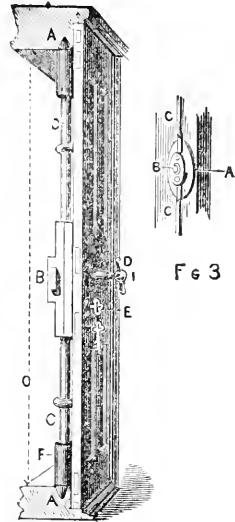


FIG. 2.

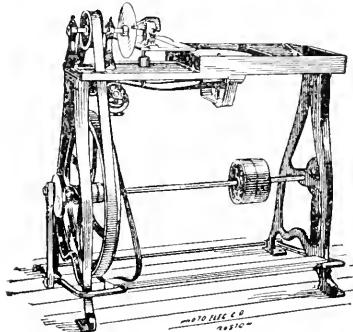


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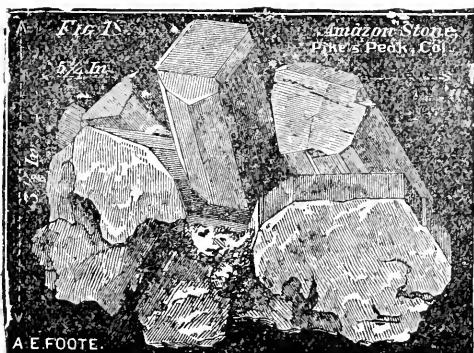
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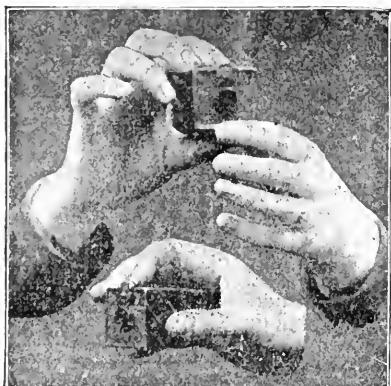
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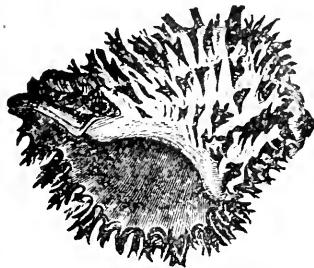
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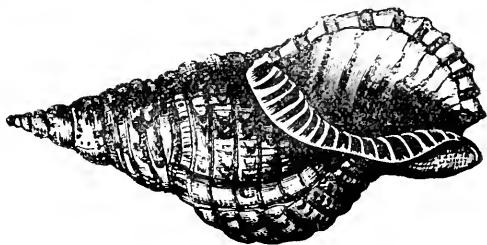
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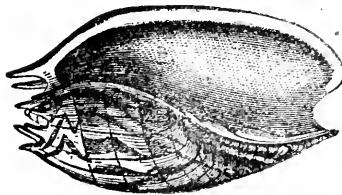
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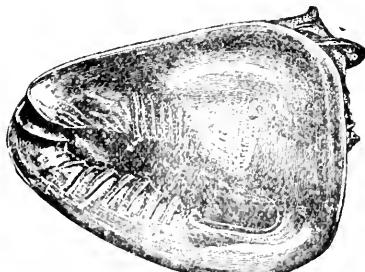
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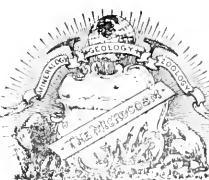
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A Monthly Magazine Devoted to Research in Natural Science.

VOL. I.

ALBION, N. Y., JANUARY 15, 1895.

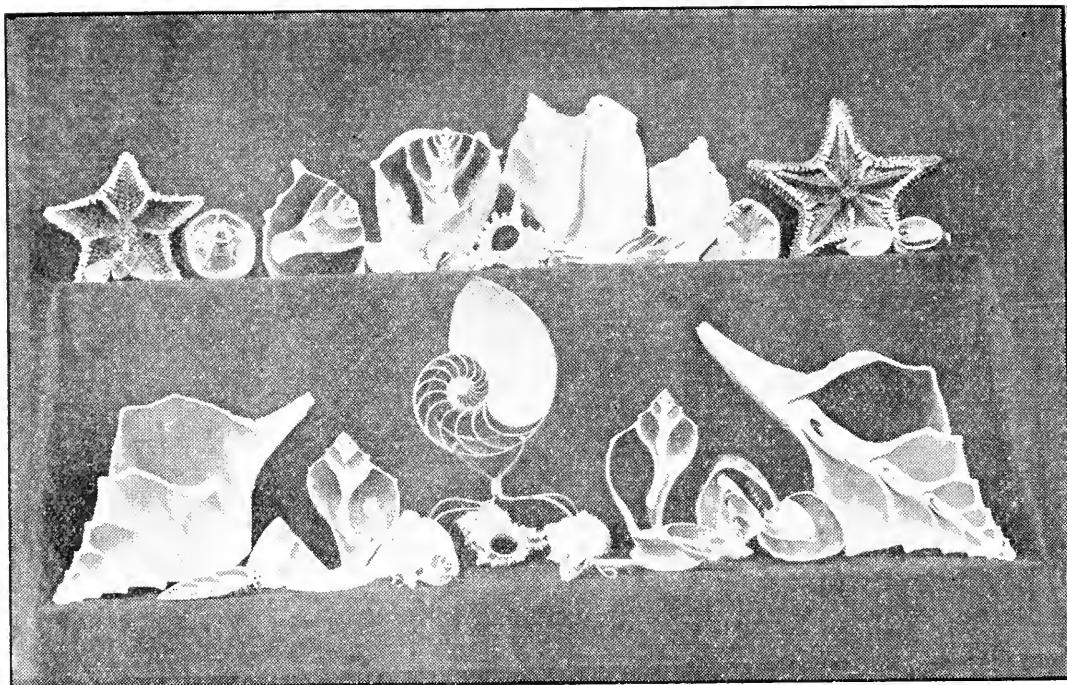
No. 3

Notes on the Nesting of the Duck Hawk.

As the Peregrine Falcon is quite rare in this locality and still rarer as a "Nidiologist," the following brief description of a nest found by the writer, may interest "MUSEUM" readers. While out on March 29th, last, starting the "'93 Oological" collecting a few miles down the beautiful Tennessee river, myself and two friends commenced a diligent search for the eggs of Black and Turkey Vultures, who nest in common along the rocky cliffs overhanging the river. We knew of one favorite hole or cave of the "Buzzards," which was on account of its central and perpendicular location always considered inaccessible, but just to find out whether the birds were nesting, one of my friends threw a large stone over the edge of the cliff, making a great noise in its descent and a terrific splash when it reached the water. Almost immediately and first, with a yell sailed out a beautiful female Duck Hawk followed by two Black Vultures. We hailed the appearance of the first with surprise and delight as this bird was the first we had observed in the breeding season, and my eyes rested in imagination on a beautiful set of eggs, almost within our grasp. However, having no means of descent down the overhanging cliff, after a little deliberation we concluded to assail the position later with the necessary accessories. So leaving the Duck Hawk with her loud monotonous Kack-kak-kak-kak

as she flew up and down in front of the cliff, we returned to our boat and home without a single specimen of "Oology" to mark the first hunt of the season, but more enthusiastic than ever.

The next opportunity occurred on April 4th, when with rope ladder, surplus ropes, guns, lunch, etc., we jumped into our boat and were soon beneath the homes of our rapacious feathered friends. After reaching the summit of the cliff, which was well-timbered with pine, cedar, and scrub-growth, I descended on foot as far as possible while one of my friends threw a small mountain or rather rolled it over the edge of the cliff in precisely the same place as on the first occasion, and to our joy, with precisely the same results. My location was a good one and as her slaty back made its appearance from beneath a huge overhanging limestone rock one great obstacle was overcome and the key to the position was in my grasp. I called to my friends to stand directly over the spot and we soon had our rope-ladder, 35 feet long, attached to an overhanging cedar. Taking off shoes, hat and coat I was soon dangling a hundred feet above the river, but having been a gymnastic prize-taker and a light-weight, I felt as much at home as one can under the circumstances. In two minutes I was at the end of my rope but fortunately it was not more than about three feet from the ledge which was two feet, apparently, in width, with a scrub cedar of stout growth on its outer edge. I could



From photo loaned by Ward's Natural Science Establishment. The publisher of the MUSEUM has just secured valuable machinery for cutting and polishing shells and minerals.

see nothing but a scant growth of long fine grass, but on gaining a foot-hold and kneeling down for safety I beheld a fine set of three eggs laid on a dry sandy bed, from which the grass had apparently been pulled away, no nest whatever, a few bones and dirty feathers, particles of small land shells, constituted the home of this beautiful Falcon.

The ledge measured 30 inches at its widest part and in extreme length about 4 feet; though it tapered off somewhat acutely at either end. The female who had been very vociferous during my visit, was joined by the male and once or twice they came with a rush towards the nesting site, but would check themselves abruptly and sail upwards. My friends could have

shot them easily but at my instigation they were not molested. Even had we shot them they would inevitably have fallen into the swift current beneath and probably have been lost.

I sent the eggs up by means of a string attached to my collecting case, and was soon after them. This was my first take of this species and I naturally felt proud of them, though subsequently they were found to be far advanced in incubation and the lusty young *Peregrinus* were removed with great difficulty. They had the usual rich red brown cloudings and mottling, and one had several large markings of blue-gray. The average measurement being 2.15 x 1.73.

WILLIAM W. WAKE,
Knoxville, Tenn.

Industries of Animals.

Among animals, as well as human beings, we find the art of hunting and fishing, of storing food in houses made for its reception, of domesticating various species and of harvesting and reaping—the rudiments of the chief human industries. Some animals take advantage of natural caverns in the same manner as do many races of primitive man. Others, like the rodents, dig out dwellings in the earth; even to-day there are regions where man does not act otherwise. Woven dwellings, constructed with materials entangled together, like the nests of birds, proceed from the same method of manufacture as the woolen stuffs of which nomad tribes make their tents.

The beavers who build huts of wood and of mud, and the termites who construct vast dwellings of clay, have in this industry reached the same point as man. Although they do not build their dwellings so well, nor in so complex a fashion as modern architects, yet they work in the same way. All of these ingenious little architects work without organs specially adapted to accomplish the effect which they reach. It is of these genuine industries that we wish to speak in the present article.

STRUGGLES OF THE CHASE.

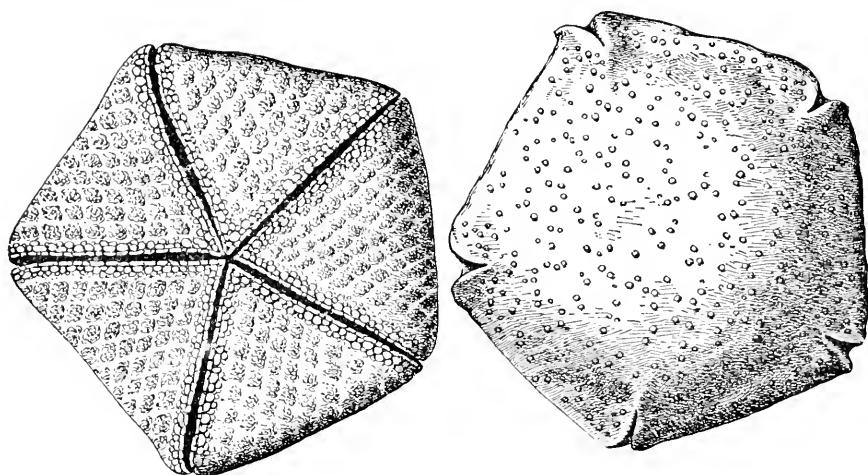
Among the birds, none display more remarkable qualities for hunting and conquering the game, than does the Secretary Bird, (*Gypogeranus reptilivorus*.) His food consists of the most deadly of poisonous snakes, and his great success depends upon his quickness in striking without being struck, since the fangs of his prey might give him a mortal wound at the first blow.

In South Africa he pursues every

snake, whether venomous or not, and so terrible is his attack that the snakes seem to feel that their only safety lies in flight. When the snake is cornered he suddenly turns round, and prepares to use his defensive weapons. The bird also stops, and turns in one of his wings to protect the lower part of his body. A terrific duel then begins. The snake throws himself upon his enemy, who at each stroke parries with the end of his wing; the fangs of the snake are buried in feathers which terminate the end of the wing, and leave their poison without producing any effects. While the Secretary bird is parrying with one wing it is repeatedly striking with the other, until the reptile is stunned, and ceases to resist. The bird then thrusts its beak into the skull, throws the reptile about in the air for a time, and finally swallows him.

HUNTING WITH PROJECTILES.

We often hear people remark that man is the only animal endowed with sufficient intelligence to utilize as weapons exterior objects like a stone or stick; and it is still more strongly stated that he is the only creature who can use these projectiles for striking at a distance. It is quite true, nevertheless, that creatures very low in the scale of organization are known to use projectiles with extreme skill for securing their prey. In the rivers of India lives a fish, *Toxotes jaculator* by name, whose principal food is formed by the insects who live about the leaves of aquatic plants. Were our fish to wait until they fell into water he would soon starve. Should he leap at them, the noise of breaking from the water would cause them to fly before he could reach them. So what does our *Toxotes* do



Culcita pentangularis, Gray.

A Pacific form of Starfish, of a solid form and sort of reddish brown color. As can be seen from cut the upper surface is covered with minute tubercles while the under surface is covered with small tubercles in regular order.

but draw in a mouth-full of water, contract his mouth, and eject it with such force and precision as to seldom miss his aim, and bring the prey into the water where he eats it at leisure. Many animals are known to squirt various liquids, both for defense and attack. The Cephalopods, those quaint mollusk of the ocean, emit ink when disturbed, which so darkens the water as to conceal them from their enemies and enable them to flee unobserved. Many insects exude bitter or fetid liquids; in these cases, and in others too numerous to mention, the animal finds in his own organism a secretion which he finds more or less useful to his conservation. In the *Toxotes*, however, the case is different, for he takes up a foreign body which he aims at an intended victim, which he strikes. It is this method which is more correctly compared with the organized hunting of man. Other fish, as the *Chelinous* of Java, has been seen to do the same thing, and to repeat the operation until he accomplishes his object.

UTILIZATION OF CAPTURED GAME.

After an animal has captured his prey it frequently becomes a question of how to make use of it, either because the eatable parts are buried in a thick shell, or because he has captured some animal which rolls itself into a ball and is covered with sharp bristles or plumes.

Many times a bird is perplexed as to how it is going to carry off a round object which has no projections. An example of this is found in our common Red-headed Woodpecker (*McIanerpes erythrocephalus*.) He is very fond of robbing orchards and is also very greedy. After filling up on all he can eat, he considers the best way of carrying another apple off for a further meal. This he accomplishes by plunging his open beak into the apple, the two beaks entering separately and holding firmly; he then detaches it and flies away to some retreat.

When the animal makes use of some foreign body, as a tool or a fulcrum, to achieve some object, it more nearly approaches the acts of man. A snake frequently swallows an entire egg with

unbroken shell; as he cannot digest it in this condition and as the muscles of his stomach are not strong enough to break it, he is compelled to strike his body against some hard object or coil himself around them until he breaks the envelope of the egg.

Our Shrike or Butcher-bird (*Lanius excubitor*) has a bad reputation for impaling his victims on thorns; this he does because his beak and claws are not strong enough to tear his prey easily. His usual method is to install himself in a comfortable spot, impale his victim on a thorn or pointed branch, and then devour it in threads. The *Lanius Collurio*, a nearly allied bird, prepares a small larder before feasting, and one may frequently see a row of victims stuck side by side on thorns—crickets, beetles, grasshoppers, frogs, and even young birds.

THE FORMATION OF DWELLINGS.

Among animals the formation of dwellings more or less elaborate has been noted for many years. One of the most notable of these nests is that of the stickleback, which is woven from grass and alyæ, and after the female has laid her eggs the male remains near to guard the young fish from marauding enemies.

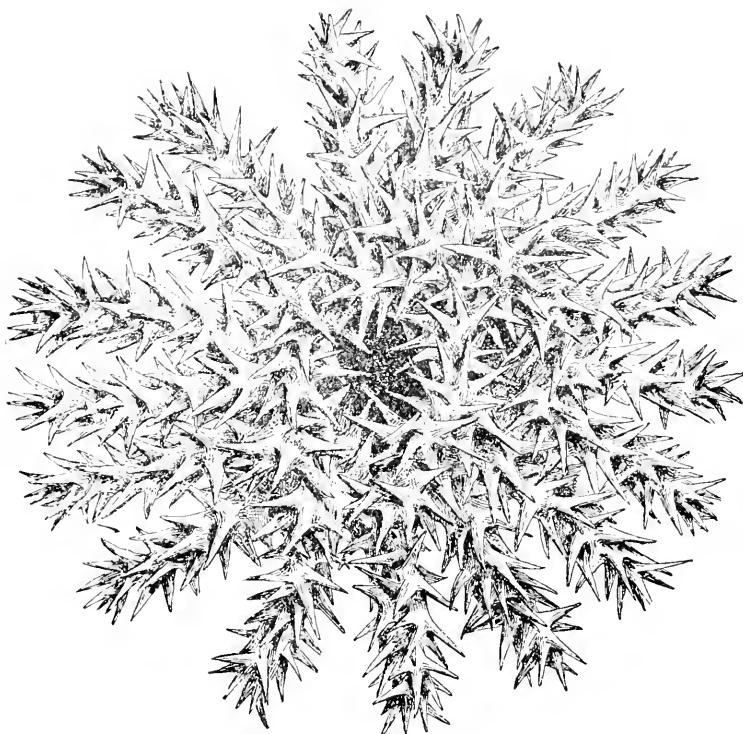
Among birds, however, we find the most expert artisans in the art of building dwellings. We may see them at any time in the spring carrying a morsel of straw, a hair from a horse's tail, or a tuft of wool which has become caught in some bush. The coarser pieces are chosen to make the framework, while the finer, softer pieces are reserved to form a lining on the inside. These nests, which lie hidden in the depth of a thicket, or in a crotch in

top of a tree, are certainly little master pieces of skill and patience.

It would seem that the art of sewing was reserved for mankind only, yet there is a bird called very appropriately the Tailor bird, (*Orthotomus longianus*.) who has solved the difficulty and prepares the most beautiful sewed nests. They place their nests in a single large leaf which they carefully prepare for this purpose. With their beaks they pierce two rows of holes along the two edges of the leaf and then pass a stout thread from one side to the other alternately. With this leaf they form a horn in which they weave their nest with cotton or hair. More wonderful is the fact that the thread used is spun by twisting in its beak spider's webs; bits of cotton, and pieces of wool. Knots have also been found at the ends of the threads. We cannot but admire the animal who has so successfully triumphed over obstacles which even perplexed early man.

Away off in China lives a swallow, who builds his nest of a gelatinous substance formed either of the spawn of fish or the eggs of mollusca or a little sea-moss; this they carry to a perpendicular wall or cliff, and apply it to form an arc of a circle. When the first deposit is dry it is increased by sticking on to its edge a new deposit. In this manner the tiny dwelling gradually assumes the shape of a cup, which, when completed, receives the builder's eggs. The nests are the famous "Edible birds' nest" so much appreciated by epicures in the extreme East.

Our common swallow is a most interesting mason. In the spring he may be seen working at his nest in the corner of a window. It is usually built in an angle, so that the then ex-



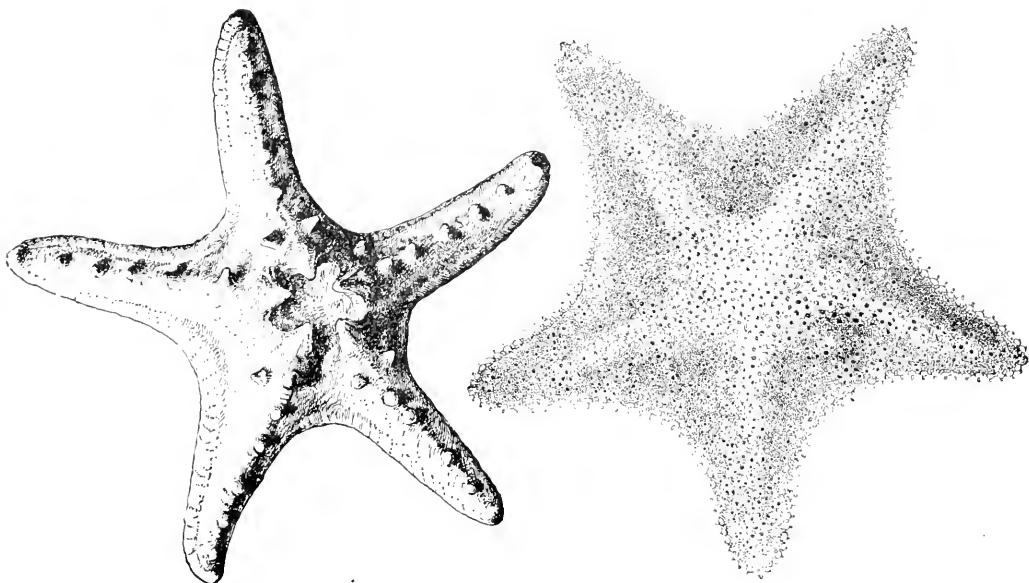
Acanthaster solaris, M. & T.

A very large, many armed species, the whole upper surface of which is covered with spines almost an inch in length. An inhabitant of the Pacific, mainly *Mauritius*.

isting walls may be utilized, and still leave an enclosed space for the nest. The form of the nest is usually a quarter of a sphere, and the bird begins it by applying earth more or less mixed with chopped hay, against the walls which are to support the dwelling. A hole is left at the summit for exit and entry. It is an interesting fact that the builder of these nests return to them for many years in succession, as long as the dwelling remains intact.

Among ants we find numerous instances of intelligence and great industry. Although so far removed from man by their anatomical structure, yet their psychic faculties are nearest to him. They have passed through an

evolution not unlike that which has brought man from his primitive condition to the proud position which he now occupies. Like man, the brain of ants has undergone a disproportionate development. Like man, they possess a language, which enables them to communicate with each other and to combine their efforts. It may be said with truth that there is no human industry in which these insects have not arrived at a high degree of perfection. The *Neuropterous* insects known as "white ants" (*Termites*) build a palace which rivals a modern city in its complex construction. Their dwellings, if compared with those of man, are colossal in size. Their nests,

*Orcaster turritus, M. & T.*

A fine Pacific form frequenting the Pelew Islands.

Goniaster equestris, GMEL.

Found on coast of England. Fine large species greatly admired.

have been found measuring fifteen feet in height, or, to make a more remarkable comparison, one thousand times the length of the builder. Even the Eiffel Tower or the Ferris Wheel, is only a hundred and eighty-seven times the average height of man. If built upon the same scale as the *Termites* it would have to be 4,800 feet.

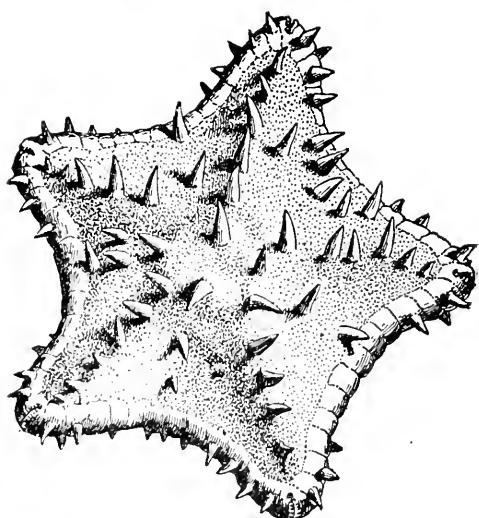
This wonderful insect builds a hillock in the form of a cupola. The interior arrangement is very complicated, but at the same time wonderfully well adapted to the wants of the inhabitants. In all there are four stories covered by the exterior walls. The walls of the dome are very thick, the clay, in drying, attains a hardness like brick ; it is said that the sentinels of herds of wild cattle choose these tumuli as observatories, and do not break them down. The exterior wall of the nest are hollowed by galleries of two

kinds; some horizontal, giving access from the outside to all the stories, the others mounting spirally in the thickness of the wall to the summit of the dome. These little passages, however, are only used during the construction of the nest by the masons when building the cupola, and are left to be utilized again should a break in the nest occur. The lower ends of these galleries are very wide and sink into the earth beneath the palace to a depth of more than four and a half feet. These subterranean passages are to be compared with the catacombs of the old European cities. Their origin is similar and they are ancient quarries hollowed out in obtaining the necessary clay for the construction of the palace. They also serve as drains, when the rainy season begins, to carry off the water.

The foregoing facts demonstrate that

the industries in which the talents of animals are exercised, under the influence of the same environments, have been reached in the same manner as man, and have formed the same combinations to protect themselves from cold or heat, to defend themselves against the attacks of enemies, and to insure sufficient provision of food during those times when it is scarce or cannot be procured. Man, of course, excels all animals in his mental development, yet this development does not differ in kind, only in intensity, from those beings below him in the organic scale.

FRANK C. BAKER.
Chicago Academy of Sciences.



Nidorella armata, GRAY

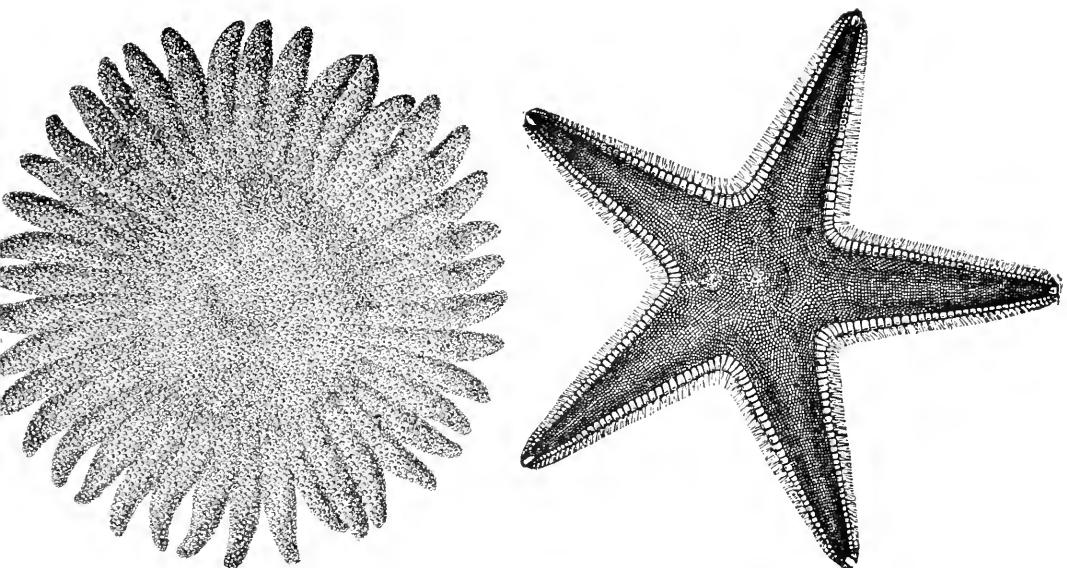
A beautiful species, the upper surface of which is covered with conical spines which are arranged in quite regular order. Average specimens three to four inches. Frequenting Pacific coast from Lower California southward.

Hudsonian Chickadee.

Parus hudsonicus.—Forst.

I have found these little fellows everywhere on island and mainland

that I have been and their cheerful presence has dee-dee-dee'ed away approaching blues more than once. I first met them at Old Fort Island, where they would frequently come and perch upon the roof of the house, and occasionally fly in at the door-way and pick up the crumbs from the floor; they were very tame and would even allow you to catch them without much opposition. Their flight was rapid and being so small in size, they would come and go with the suddenness of a shadow, and one could seldom follow their flight for any distance. They often fly off in a zigzag series of straight lines, as if uncertain in which direction to go, and as often return to their former port, the roof of the house, as if fully aware that that was the safest place after all. I have stood in some open spots of ground, not a retreat near me, and scanned the air everywhere about for a sign of life in vain, when suddenly a whirr, a dee-dee of derision or of triumph, and the little fellow had appeared and disappeared without my even having caught a sight of him. Their favorite resting place seemed to be on the roofs of houses. The people of the coast are very fond of them and call them woodpeckers. They would frequently caution me with "now don't you go and shoot my little woodpeckers." I found them all about the islands among the low, and stunted growths of fir and spruce. If I pretended to watch them they would hide in the evergreen, not even chirping, and remain there sometimes for nearly an hour, while I walked about softly and peered around to see them—they running or creeping out of sight or remaining perfectly still be-



Heliaster Kubingii, XANTHUS.

Commonly called The Mexican Sun Dial. A very curious, many armed species, found along the Pacific coast from Lower California southward.

hind some bough until forced to fly. Sometimes they would give me the slip entirely, and often the most successfully when there was apparently the least chance of their escape without detection. They were on the mainland in low growths, and in the woods when no other apparent living creature was about; in midday, at early morn or late evening. They were everywhere when you least expected to see them, and when you were looking for them, not one could be found, search high or low. Veritable "Brownies" all around, when lo! in a second, the places that teemed with them were as silent and deserted as the grave.

In my residence on the coast I grew very fond of these little fellows. If at times they were shy and retreating,

Astropecten bispinosus, M. & T.

Commonly called Chinese Star. Much admired on account of perfect five rays, upper surface being covered with fine star shaped points, and the edges set with two rows of sharp pointed spines, a quarter of an inch in length.

they as often displayed the inquisitive side of their nature. In wandering listlessly about with no apparent object but to kill time, we have passed many delightful hours together. If in the heat of midday or the cool of evening I have sought me out a convenient and sheltered retreat, I had not long to wait before several would appear.

We will remain still for a moment and see what they will do. At length one bolder than the rest, jumps upon a sprig of spruce about five feet from my body. As the bow bends and tilts the little fellow to and fro, which operation he appears to love amazingly, he balances himself deftly peers up and down and around cautiously, then launches into a most furious tirade of dee-dee-dee's that wake the echoes in

the old wood, and seems a signal of safety and a call for gathering of every Chickadee within twenty yards around. Then they began to gather. Every bush swarms with them. I remain still, and the cautious little fellows hop nearer. If I move they are off; if I remain perfectly still they hop around and over me without the slightest hesitation. My large boots seem the object of the greatest curiosity to them, and more than once several good sized overflow meetings apparently took them for a text and preached with great success, each bird in his turn, then altogether upon this topic alone. At last, and somewhat unconsciously, one toe moves several inches, when whist! the panic that ensues is fearful and the meeting overflows and all breaks up in an instant. A whish of many wings, a vindictive ee-ee-ee, growing fainter and fainter, then ceasing altogether, and I am positively alone. Did I wait ten minutes they would all come back; but my attention is called in another direction. The Hudsonian Titmouse breeds in the interior, all up and down the coast, where it prefers the tangled undergrowth so difficult of access. Its note is wheezed and not a clear pronounced "dee," repeated several times.—By Winfred A. Stearns in "Bird Notes in Labrador."

The Florida Phosphate Rock.

The ordinary phosphate of commerce so indispensable to the farmer, is, in its raw state, a rock of a peculiar formation, found chiefly in Florida, with a few out-croppings in the adjacent states of Georgia and South Carolina. A full discussion of this subject belongs to the

agricultural journals, but there is one phase which it is the especial province of a journal having the scope of the MUSEUM to consider.

This is the origin and formation of the rock.

Phosphate rock owes its name to the fact that it contains a very large percentage of phosphate of lime, a substance which does not enter to any great extent into the composition of other rocks. It is this fact that gives it a commercial value as well as a geological interest. The origin of the rock is not perfectly understood and various theories have been advanced concerning it; some of which are nonsensical, others, at first appearing to be sound but evaporating when a more thorough knowledge is had, and a few which, to a greater or less extent, seem to stand the test, and one which, in the light of present knowledge fully explains the matter and may be assumed to be correct. To understand it thoroughly it is necessary to review briefly, the geological history of Florida.

Until a comparatively recent date, the peninsula of Florida had no existence. The Gulf Stream entered what is now the Gulf of Mexico, swept its western and northern shores, and, emerging hugged closely to the south-eastern corner of the United States. At length the Mississippi river deposited enough sediment at its mouth to change the direction of its current after reaching the ocean. It now bore to the south-east, directly against the Gulf Stream, and with sufficient force to slightly deflect the latter. One result of this deflection was the formation of a quiet place at the point where the Gulf Stream turned towards the

north, into which sediment, held in suspension was deposited. In the process of time this deposit became a huge hill, or rather a succession of hills, reaching nearly to the surface. Then the coral insect was carried thither, and, at length the deposit of mud became a series of coral islands. The work of the coral insect was continued until the islands were united into one long reef; then, bending at each extremity towards the north, it finally united each end with the mainland and formed a lagoon of stagnant water in the interior.

The creation of this reef still further deflected the Gulf Stream, and, by an exactly similar process, a second reef was created enclosing a similar lagoon; then, still further to the south, came the third, then the fourth, and then the fifth. And now the same influences are at work in the long string of islands off the southern extremity of Florida, and, after the lapse of a sufficient number of years, a sixth reef will be added and the peninsula of Florida will extend still farther to the south. So far as we can foresee, this will continue until the Gulf Stream will be shut out from the Gulf of Mexico, the results of which we cannot predict.

But to return to the phosphate. These lagoons, as soon as the water became still, began to teem with animal life peculiar to the geological period and their own physical conditions.

Now nearly every living organism secretes from its food, or drink, or from the element in which it lives, certain mineral substances with which to build the framework of its system. The principal minerals thus secreted are carbonate of lime, phosphate of lime, and silica. In all of the vertebrates, carbonate of lime greatly

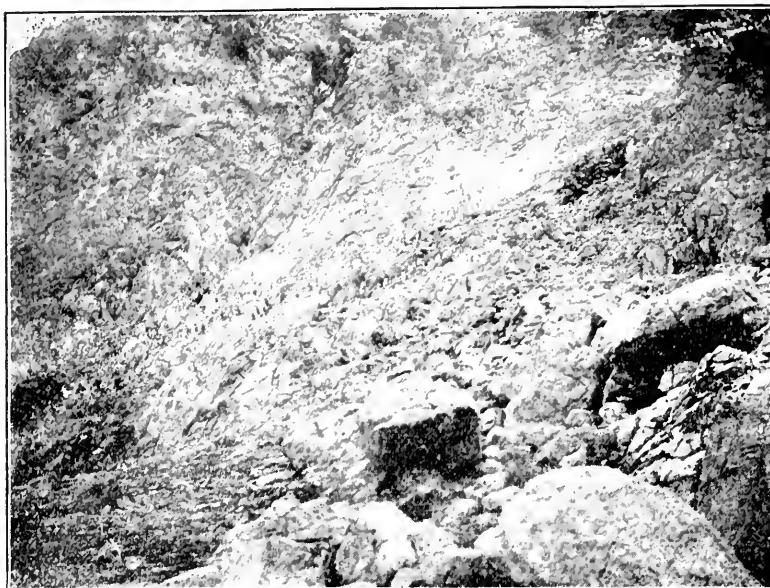
preponderates. In some of the mollusks, carbonate of lime forms the greater portion; in others a greater percentage of phosphate of lime is found, and in some, as the Lingula, for instance, the shell is composed almost entirely of it. Certain of the Foraminifera also secrete phosphate of lime in large quantities; as do certain Infusoriae.

We know that in geological ages, certain forms of animal life existed, which secreted carbonate of lime in such quantities, and in such numbers that vast deposits of that substance were formed by the death and disintegration of the respective forms; and it seems very probable that in the lagoons already described and which from various causes became filled, there existed, in certain localities, species of Mollusks which formed their external shells of phosphate of lime, and that the death of these Mollusks and the consequent disintegration of their shells created the deposits which we now know as phosphate rock.

Dusky Grouse.

Dendragapus Obscurus.

The dusky Grouse is resident, and by no means uncommon in the heavily wooded ranges of the Gallinass Valley in North Central, New Mexico. Its immigrations if they can be properly so called, seems to be from the Aspen Groves in the foot-hills, where they nest, to the Coniferous belts during winter. They are hardly common enough to be found in the markets. Still they are excellent eating though they at some seasons at least have a somewhat musky flavor, which is by no means unpleasant. They are tame



View from Farrolone Islands off San Francisco, Calif., showing the immense Colonies of California Murres.

and unsuspicious and consequently are easily procured when once in their haunts. They share the habit of Grouse in general, of rising abruptly with a whirring noise generally but a few feet in advance of the huntsman. They fly some distance and alighting, remain motionless after the manner of the Ruffed Grouse. Specimens frequently measure twenty-four inches in length, so that the Dusky Grouse is one of the largest of the Grouse family.

They are generally hunted in the month of August before the young are fully grown, but the proper time is during September. They leave the Aspen Groves in the latter part of autumn, retiring to the pine belts where they subsist largely upon the leaves of the Coniferae. I have found newly-hatched chicks by the 21st of June at an altitude of 9,400 ft. They were about the size of domestic chicks with their heads and backs beautifully striped with brown.

A man living in the mountains once captured three of these chicks, which he took to his ranch and gave them in charge of a domestic hen, having a brood of chicks of her own about the size of the young grouse. One of these died but the other two lived to become of fair size and then departed to the woods to shift for themselves. I have never known this grouse to make any other note except a clucking something similar to that of a domestic hen. Their nesting habits do not appear to differ essentially from those of other grouse.

EMERSON ATKINS,

Formerly of
East Las Vegas, N. M.

Santa Clara, Calif., Nov. 25, 1894.

Dear Mr. Webb:—I must say that the Nov. MUSEUM has come to hand and a most pleasant surprise it is! The make-up is *very* neat and contents *good*.

It is totally unlike any publication in the field and I predict a prosperous life for it.

Cordially Yours,
C. BARLOW.

THE MUSEUM.

A Monthly Magazine devoted to Ornithology, Oology, Mollusca, Echinodermata, Mineralogy and Allied Sciences.

**Walter F. Webb, Editor and Pub'r,
Albion, N. Y.**

Correspondence and items of interest on above topics, as well as notes on the various Museums of the World—views from same, discoveries relative to the handling and keeping of Natural History material, descriptive habits of various species, are solicited from all.

Make articles as brief as possible and as free from technical terms as the subjects will allow. All letters will be promptly answered.

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**WALTER F. WEBB,
ALBION, ORLEANS CO., N. Y.**

NOTES.

Some rare birds mounted at our establishment since the last issue, were the Flamingo, Scarlet Ibis, and Emperor Goose, all males and in perfect plumage.

We have a very interesting letter from Dr. J. W. Velie, of St. Joseph, Mich., relative to his large collection. The Doctor desires to sell same to some Museum, if possible, and we can heartily recommend it, comprising as it does, very choice collections of mounted Mammals, Birds, Reptiles, Fish, and Skeletons, Minerals, Fossils, Corals, Shells, Land, Fresh Water and Marine, Sponges, Birds' Nests and Eggs, as well as a very fine Archaeo-

logical collection. It can be bought right, and we trust those able to purchase, and desiring such, will write him.

Attention is called to our advertisers. We have reason to believe all are strictly reliable, and here wish to announce, as I do not think it has been before mentioned, that if any reader of this journal at any time, should be unfairly dealt with, by any of our advertisers, we would be pleased to be informed of the facts. It is with regret that we have been obliged to decline some advertisements for this issue, as we have abundant proof that the parties referred to are either, wilfully or innocently doing a crooked business.

The results were so very satisfactory that we have decided to continue our premium offer with some changes. We want all our friends to subscribe while this offer holds good, as we cannot promise to continue it beyond the February issue. To those who are not able to accept it prior to that time, if they will kindly write us a line, stating the facts, we will enter them as a regular subscriber, and send the premiums when they are able to remit. We hope to hear from all who intend to take the MUSEUM, sooner or later, in response to this notice.

We note an "unsolicited testimonial" in one of our exchanges, "*The Oologist*." Thanks, brother Lattin. We append a slight review of same and other matter from the same source, in another column of this issue.

With this number we present a number of cuts of shells and Starfish. We had a large number of letters expressing thanks for inserting the few in November MUSEUM; and trust these given with the short notes added, may be of equal interest. We would be much pleased to have our friends along the Atlantic and Pacific shores, or those in distant lands who receive this copy of THE MUSEUM, to write up detailed accounts of the Mollusca or Echinodermata of their respective territory. Reliable information on the latter is especially wanted, as there are very few good works on the subject.

A new feature that we expect to incorporate in the February MUSEUM, is a department of Mammalogy, which is to be handled by an experienced student of this branch of Science, who has had large experience in the field as well as "The closet." His non de plume, will be "Tyro" and all communications for insertion under this head, must be addressed "Tyro," care of "THE MUSEUM," Albion, N. Y. Just at this period, when all branches of Natural History are making such rapid strides, a guarantee to our readers, of interesting notes on Mammalia, will be hailed by all true Naturalists with delight. The Publisher of THE MUSEUM, is anxious to make this department a sweeping success, and asks all parties who have made a special study of any kind of mammal, large or small, to write up notes on same, making as brief as possible and yet covering necessary details, and forward as above directed. All will be duly acknowledged.

We have received through the courtesy of Mr. Whitmer Stone, Curator of the Ornithological Section of the Academy of Natural Science of Philadelphia, a copy of the Birds of Eastern Pennsylvania and New Jersey. The frontispiece is a fine portrait of Alexander Wilson, taken from a drawing now in the Philadelphia Academy and formerly the property of George Ord. The work proper consists first of an introductory chapter on Geographical Distribution and Migration, prepared under the direction of the Delaware Valley Ornithological Club, and illustrated with admirable cuts. Second with descriptions of such birds as have been recorded in the territory under consideration, outlining their breeding range, and winter distribution. We note many extremely rare species that have been recorded in Eastern Pennsylvania and New Jersey coast, and heartily recommend the work to all active ornithologists. It contains nearly 200 pages, finely printed and bound in neat cloth, Address Whitmer Stone, Academy of Natural Science, Philadelphia, or send Publisher of THE MUSEUM \$2 bill and we will send book prepaid and a years subscription to the MUSEUM.

A REVIEW.

If any of our patrons have received a bundle of circulars *recently*, in which are outlined so called facts, and extraordinary statements, some of which are evidently designed as direct thrusts at the editor of THE MUSEUM, and in a later mail read the soap-soapy editorials calculated to in a measure atone for past deeds &c., we will simply add that the whole batch of stuff is char-

acteristic of the author and as such will doubtless be *treated* accordingly.

We have for some months been filling a good large percentage of said party's orders, and as for the "chestnut" stock and various other remarks they compare very well with the newspaper article written up by an entire stranger at \$2 a column, also the "various mammoth warehouses and museums, &c.," which are all summed up in one shop (formerly a barn) probably 20x26. Space will not permit us to further review these most extraordinary epistles, but if any of our friends haven't seen them yet, advise us and we will furnish them a copy, from the stock that has already been sent to our office, most of which were side lined with remarks we do not care to print.

The Chimney Swift.

The Chimney Swift, which is commonly, but erroneously, called the Chimney Swallow, justly deserves by reason of its peculiar nest, to be called one of the most interesting of New England birds. At the present time it is comparatively rare at least in this immediate locality, but, if we may credit the statements made by the older historians, and by our old men, who, themselves heard it from their grandfathers, the bird once existed here in prodigious numbers. It is named from the fact, that at the present time it generally builds its nest in the interior of an unused chimney. Rarely it builds in the gables of old barns.

Its nest it composed of small crooked twigs, curiously and ingeniously interlocked and woven together and cemented by a yellowish, translucent sub-

stance which closely resembles glue, and which, I believe is manufactured by the bird itself, by means of a series of organs specially for the purpose and which are situated in the bird's mouth. By means of this substance the nest is firmly attached to the interior of a chimney, or to the perpendicular end of a barn. The heat of the sun during a warm summer day is sufficient to melt the glue and this the bird seems to understand, for the nest is never built where the sun's rays can reach it. The glue is likewise soluble in water but this fact the bird does not seem to realize, for the nest is frequently built in a chimney in such a position that the rains, entering the chimney dissolve the glue and allow the contents to drop.

Before the country was settled the bird was accustomed to build its nest in hollow trees. It was then gregarious and hundreds of birds sometimes occupied the same tree. Now, however, it is extremely rare to find more than a single nest in the same building. I know of a nest in a barn which has been occupied every season for at least sixteen years and from one to three broods have been raised each year and yet but one pair of birds has ever returned in the spring, and so far as I have been able to discover no other nest has been built nearer than two miles. At the present time it is believed that the bird never builds in trees, its residence being either in a barn or in a chimney and generally in the latter place. During the whole of my collecting I have not found more than half a dozen nests except in chimneys. When in this location the eggs may be collected with very little diffi-

culty, simply by fastening a small, well lined box to the end of a pole—a jointed fish pole is best—and holding it just below the nest, then with another pole gently detach the nest and allow it with its contents to fall into the box.

In this locality where the manufacture of maple sugar is an important industry and nearly every farm has a set of buildings specially for the purpose, and which are occupied only a few weeks during the months of March and April, the chimneys of these buildings are a favorite resort. Prof. Cook in "Birds of Michigan" cites an instance of Chimney Swift occupying an abandoned nest of a Barn Swallow. While giving the professor much credit for his work, I believe him to be mistaken in this case. I do not think the Swift ever occupies the nest of any other bird, though possibly it might do so if its own nest should be destroyed just as the bird was about to lay its eggs. The eggs of the Phœbe are of a similar size and color as those of the Swift and might be mistaken for them and its nest is similar to and in some instances closely resembles that of the Barn Swallow, and I believe that the correspondent of Prof. Cook mistook the eggs of a Phœbe for those of a Swift and its nest for that of a Barn Swallow.

I have already alluded to the fact that formerly the Swift made use of hollow trees for nesting places. I wish now to more fully describe some of these trees and especially note a most singular circumstance connected therewith.

Wilson described a sycamore in Ohio five feet in diameter which had doubtless been used by thousands of birds, perhaps for centuries, for its immense

hollow was found to be filled for a space of fifteen feet with feathers, excrement, rotten wood and the exuvia of insects. Hundreds of similar trees, differing only in size and species, have been found in this state, but only in a single instance so far as I know have they received any particular attention. A tree was found at Middlebury, some years ago the diameter of the hollow of which was about fifteen inches. This cavity was filled for a depth of seven feet with the same material as the one described by Wilson. Now, had the feathers been scattered promiscuously throughout the mass there would have been nothing remarkable about it; but such was not the case. The feathers were nearly all carefully arranged with the quills pointing out, and the plumes pointing towards the center of the cylindrical mass, and were mostly arranged in layers each layer being between an alternate layer of other refuse.

This arrangement might, possibly be accounted for by supposing that squirrels or other small quadrupeds had habitually nested in the hollow and had so placed the feathers for the purpose of making a more comfortable bed.

But this arrangement is by no means the most curious circumstance connected with the deposit. Scattered through the mass were found a large number of wing and tail feathers arranged with relation to each other, exactly as they belonged in the living bird. In many instances the secondaries were occupying their relative positions, both in relation to one another and to the primaries. In no case were any other feathers than those of the wing and tail so found and in no

case were any bones, beaks, claws or other parts of the bird found.

Now the question arises, how came these feathers in this position? They could not have been so dropped by the living bird; nor would any bird or animal have sufficient intelligence to so arrange them. The most reasonable conclusion seems to be that the birds died and were buried by the accumulations above. But in this case what has become of the remainder of the bird? We know of no insect that would devour all the bird except the wings and tail feathers and leave those intact. Had any animal eaten the remainder the feathers must have been displaced. Nor do we know of any chemical agent which could have been formed by the decomposition of the mass or otherwise that would dissolve the flesh, bones and small feathers and have no effect upon the large ones. The question remains unanswered and we await replies.

Meantime a specimen showing the alternate layers and the feathers in the positions as described has been placed in the museum of the University of Vermont where it may be seen by any visitor.

C. O. ORMSBEE,
Montpelier, Vt.

Walter F. Webb, Esq., Albion, N. Y.

Dear Sir:—The sample copy of the MUSEUM just received, for which please accept my best thanks. You must allow me to congratulate you for adding such a jewel to the study of Natural Science. I will do my best, and try and get some new subscribers. You can consider me one for life.

Yours Truly,
JNO. W. DANIELS JR.
Naturalist,
Lynchburg, Va.

ARCTIC NOTES.

On the Habits of certain Rare Northern Birds in Commander Islands and Kamtschatka, by Leonhard Stejneger.

Taken from his excellent Report to the U. S. National Museum, continued from December number.

RED-BACKED SANDPIPER.

Tringalpina pacifica.

Several specimens were collected on May 26th and 28th, '82, on Behring Island, where they were evidently on their spring imigration. It arrives and departs with the other Sandpipers. Does not breed.

GREENSHAWK.

Lotanus nebularius.

Specimens collected, May 2d to 23d, 1883. It occurs regularly on the Islands in the spring but does not breed here as far as I know.

WANDERING TATTLER.

Heteractitis incamus.

This species comes to the islands during the latter part of May, and may then be met with on the stony beach, close to the waters' edge, in pairs or in very small troupes. At the time of their arrival they are less shy than *totanius* birds generally, but their conduct changes after awhile, so that I only once, on Copper Island, in the middle of July, observed a single specimen during the summer, although I feel suspicious they breed there. Its habits are rather peculiar in many respects, reminding one of the Oystercatcher. It carries its body much in the same manner as *Actitis macularia*, but very seldom flirts its tail up and down like the latter, nor has it much of the peculiar movement of the head and neck as the Spotted

piper. It is a much more quiet bird, very often standing immovable for a long while staring down into the water. Its flight is graceful and very rapid. Its voice loud and harsh, almost screaming. I only met it among rocks and stones, seldom if ever on the sandy beaches.

AMERICAN WHITE-FRONTED GOOSE.

Anser albifrons gambeli.

A specimen was shot on Bering Island. It seems to occur regularly during the spring migration, but doubtless does not breed.

HUTCHIN'S GOOSE.

Brantacanadensis hutchinsii.

I found this species breeding in small numbers on Bering Island, where I observed them repeatedly on the large swamp east of the village, and where afterwards an adult was shot and one of the six downy young captured. My hope that the latter might escape being eaten by any of the six hundred dogs of the village was not fulfilled. In 1883 the first arrivals were announced on the 2d of May, and on the 9th of June a male was killed near Saranna. This species has been found breeding on the Kurile Islands and seems to pass the winter in Japan.

PINTAIL.

Dafila acuta.

The first birds were observed April 23rd. Four days later they were seen in the neighborhood of the village. From this time on they were seen everywhere in suitable places, as this species is undoubtedly the most numerous among the fresh water Ducks on the island. Still on the 20th of May, I found them

in flocks but soon the pairs dispersed over the tundras and the swamps of the valleys, and already the 4th of June a nest with seven eggs was secured on Toparkoff Island; six days after another nest with five eggs was taken.

HARLEQUIN DUCK.

Histrionicus histrionicus.

This species inhabits the rocky shores of the Commander Islands, in large numbers all the year around, and larger or smaller flocks may almost at any time be seen, diving and swimming near the breakers, where the high and inaccessible promontories tower up from the sea or long, shallow and stony reefs stretch out from the shore for a quarter of a mile or more. It loves the surfs and rocks and is, perhaps, more expert in diving "at shot" than any other duck, not being particularly shy, however. I watched their large assemblages during the whole spring of 1883 and noted solid flocks at Bering Island, as late as the middle of June, and on Copper Island on July 1st, the latter, however, consisting of adult males, all in their most beautiful plumage. The natives or residents knew of no instance of its eggs or its small young having been taken or seen; nor did I succeed in finding any evidence of its breeding, so that I have little doubt but that the numerous flocks which remain over summer consist of birds not propagating during that season, for some reason or other. It is also probable that the flocks observed on July 1st and later, exclusively consisting of males in full adult plumage, are composed of adult males having already left the females and young on the breeding

haunts, which I suspect to be the interior mountainous parts of Kamtschatka.

OLD SQUAW

Clangula hyemalis.

The males commence assuming their dark nuptial plumage about the middle of April, most of them being in full change the latter part of the month. The time varies a great deal in different individuals, so that while two males, shot on the 2nd and 3rd of June were in full nuptial plumage another shot three days later had not passed through more than half of the change.

It is one of the commonest ducks on Bering Island, and is a resident throughout the whole year. It breeds on all the lakes and lakelets of the island. The eggs of a full clutch consisted of six.

Butterflies and Moth Life.

The winter time, while not the best friend in which the collector of Butterflies and Moths can exercise the talents of research and study he may possess, yet the snow and frosts do not altogether preclude the possibility of securing some good additions to the collection. Go out among the bare and gloomy looking vegetation, look well over the maples which almost invariably line the streets of our towns and villages. The *Altocus Cecropia* a prince among beautiful moths often may be taken in the cocoon in large numbers. Beneath walnut trees you occasionally will make the lucky find of dozens of *Attacus Luna*, to my eyes the most beautiful moth in America, hanging from the Boxwood and Wild Cherry branches you sometimes find

Promethea in considerable numbers. While the ugly *Ailanthus* trees give a holding for the cradles of numerous *Atticus Cynthia*, which by the way, are a foreign moth, become domesticated. Some moths, of course do not emerge from the cocoon when the time comes for the feeding to stop and the larva to turn to the chrysalis, he descends to the bottom of the tree and buries himself in four or five inches of earth, there to lie until spring warms his sluggish juices into life and a new winged beauty is given to the world. The hint might be taken by some collectors who, wondering where the pupæ of certain caterpillars have gone, does not think that what is beyond the eyes-reach may be turned to the light with a spade.

The main difficulty in the collecting of all sorts of Entomological specimens —cocoon, chrysalis, Moth or Butterfly—appears to be explainable in the fact that the specimens assume such peculiar formations, especially in the Larva that they are only to be learned by study and experience does the explanation come for many hours of baffled study and curiosity.

R. P. FROELICH,
New York City.

Hampden, Mass., Dec. 20, 1894.

Walter F. Webb, Albion, N. Y.

Dear Sir:—I wish to say a few words of thanks for your generous offer of the MUSEUM. I am more than satisfied. It is the *most* interesting magazine I ever read. Hoping to have a larger order soon I am

Respectfully Yours,
JOSEPH T. DALTON.

Toronto, December 26, 1894.

Walter F. Webb, Albion, N. Y.

Dear Sir:—Our advertisement in the first number of THE MUSEUM has brought us in an unusual number of replies, and from a business point of view the results are excellent.

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OLIVER SPANNER & Co.

Vanilla and Its Cultivation.

BY F. H. KNOWLTON, PH. D.

We are so accustomed to speak of vanilla as the product of the "vanilla bean," that perhaps few persons are aware that it has no connection with either the bean or the bean-family, but is produced by a beautiful, sweet-scented, climbing orchid. This widespread error doubtless arose from the fact that the vanilla capsule or pod, which is slender, from 6 to 10 inches long and only $\frac{3}{8}$ of an inch in diameter, has a vague resemblance to certain bean-pods. It is much more like the pod of the so-called catalpa bean, which also has nothing to do with the true bean-family, being a begonia or trumpet-flower. The name is, however, too firmly fixed in popular language to attempt to change it.

The orchid producing the vanilla bean is known by botanists as *Vanilla planifolia*, and is a native of Mexico and Tropical America. It has a thick, fleshy stem, oval alternate fleshy leaves, and a short spike of numerous white or greenish white sweet-smelling flowers that are curiously irregular in shape like those in most of the orchids. The plant climbs over trees and shrubs by means of numerous slender rootlets sent out from each joint of the stem, which cling to the bark or other support. It was formerly supposed that this orchid, like so many of its relatives, was an epiphyte, that is grew upon other plants, but derived its nourishment wholly from the air, but it is now known that such is not the case. It maintains connection with the soil throughout its whole life, especially by means of the rootlets which in the lower portion of the stem

reach the ground. In its wild state it climbs fifteen or twenty feet high, but in cultivation it is usually kept down within easy reach of the cultivator, for much care must be taken not to injure the unripe pods.

The vanilla plant is always propagated by means of cuttings. In Mexico where it has been cultivated for nearly or quite a century, it is customary to take portions of the stems two or three feet long. The leaves are removed from several of the lower joints and usually three joints are laid under the soil and covered to a depth of two or three inches, and the upper portions trained against the support prepared for it. The soil has to be especially prepared by trenching to a depth of 18 inches and must have a perfect drainage. The best soil is said to consist of fine rich loam mixed with equal parts of sand and leaf-mold.

Something must be provided for the vanilla plant to climb over, and rough-barked living trees are perhaps the best, but almost anything such as rough, branching trees, trellis work, stone pillars or stone walls, may be utilized. The plants are best grown in moderate shade, yet a certain amount of sunshine is required to ripen the pod.

In its native country the vanilla flowers are fertilized by insects. That is the flowers are so constructed that it is absolutely impossible for the pollen to reach the stigma or immature pod without external aid, and this office in Mexico and Central America is performed by a peculiarly constructed moth that visits the flower for the nectar always present. The pollen-mass consists of thousands of little grains tied loosely together by deli-

cate cobwebby hairs. The mass has a sticky disk that adheres to anything touching it and is torn bodily from its pocket.

When the vanilla plant was first introduced into the West and East Indies it poved for a time a great disappointment. The plants grew vigorously and produced an abundance of fine flowers but no pods. All sorts of expedients were tried in the way of cultivation, but to no avail, and the cultivation was about to be abandoned, when the fact was discovered that the particular moth that fertilized it in Mexico was absent from its new home and consequently the plants were not able to set pods. After this, artificial pollination was resorted to, and the pods were produced in characteristic abundance. The instrument with which this is accomplished may be a long needle or splint of bamboo, four or five inches long. It requires only a moment to do this, and one person may properly fertilize as many as a thousand flowers in a single morning.

The plants usually begin to flower the second year after planting, but do not reach maturity until the third and fourth years. The pods require a month to reach full size and six months more in which to ripen. The proper time for gathering the pods is determined by the appearance of a slight yellow tinge at one end or when they crackle slightly when pinched between the fingers. The process of curing is a long and somewhat complicated one, requiring in some cases as long as three months. Curiously enough the aroma of vanilla is said not to pre-exist in the pods, but to be produced by a process of fermentation. In Reunion, where it is extensively culti-

vated, the pods are placed in a basket and plunged for half a minute into very hot, but not quite boiling water. They are then placed on mats to drain after which, for the next six or eight days, they are exposed, between woolen blankets, to the sun, but kept in closed tin boxes during the night to undergo a slight fermentation. When the pods have become brown and soft they are placed in the shade to dry, care being taken that they do not mold. Daily they are carefully pressed between the fingers, slightly anointed with oil, which renders them supple and lustrous. When the pods are perfectly cured they are of a rich, dark chocolate color, pliable in texture, and perfectly free from moisture.

In Mexico the curing is somewhat different. After gathering, the pods are placed under sheds in heaps until they begin to shrivel. Then they are allowed to ferment slightly, after which they are exposed to the sun in woolen blankets during the day and kept in air-tight tin boxes at night. At the end of a day or a day and a half they have assumed a rich, chocolate brown color. They are then placed in the sun for two months or more to dry, at the end of which time they are, like the others spoken of, pliable and free from moisture.

When finally prepared the pods are sorted according to lengths and tied up in bundles of 50 and the bundles are packed in air-tight tin boxes. When properly prepared and in what is called 'prime condition' the vanilla pods become covered with a frosting of little needle-like crystals of vanillic acid, are soft when pressed between

the fingers and give off the characteristic balsamic odor.

The perfume or essence is extracted from the vanilla pod by prolonged soaking in alcohol. The proper proportion is about $\frac{1}{2}$ pound of pods to each gallon of 60 per cent alcohol. The pods are cut up into small pieces and should stand for a month with an occasional shaking, when all worth extracting will be found in the alcohol.

A word as to the sources of supply and quantites used may be of interest. The cities of New York, London and Paris may be regarded as the vanilla markets of the world. The supply sent to New York is produced in Mexico, and is regarded as the finest quality grown. The amount imported in 1891 was 135,875 pounds. The Pacific coast and western portions of the United States obtain a part of their supply from the Island of Tahiti and the Sandwich Islands, but the quantity imported in 1891 was only about 5,000 pounds. The quality is much inferior to the Mexican.

The London supply is obtained largely from Mauritius and Seychelles, but the raising of vanilla has never assumed much importance in any of the English colonies.

The greater part of the vanilla imported into France comes from Reunion. In 1880 the amount was 164,289 pounds and in 1889 it had increased to 506,463 pounds, or more than twice the product of the rest of the world.—*Popular Science News.*

Boulder, Colorado, Dec., 24, '94

W. F. Webb,

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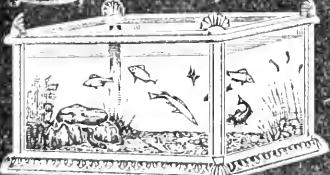
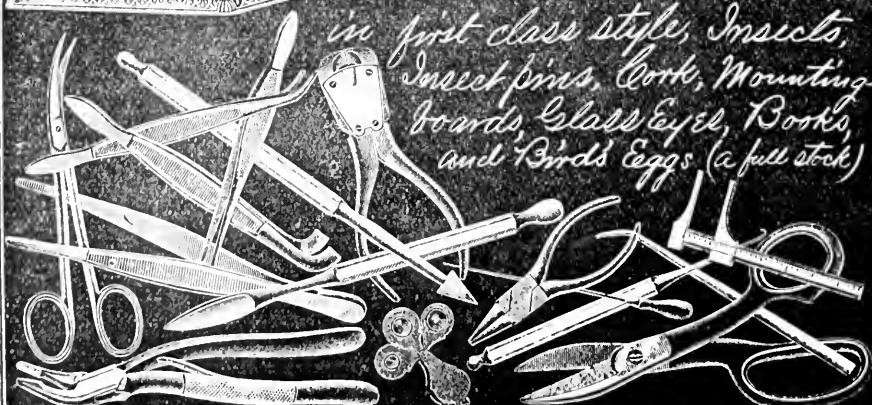
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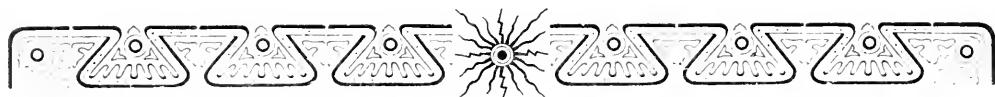
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Chachalaca.....	60	Song Sparrow.....	02	Bush-Tit.....	25
Red-bill Pigeon.....	75	Mountain Song Sparrow.....	25	Blue-gray Gnatcatcher.....	20
White-wing Dove.....	20	Heermann's Song Sparrow.....	10	Wood Thrush.....	06
Mex. Ground Dove.....	50	Samuel's Song Sparrow.....	05	Wilson's Thrush.....	12
Mourning Dove.....	50	Texas Sparrow.....	50	Russet-Lacked Thrush.....	15
Turkey Vulture.....	75	Towhee.....	10	Hermit Thrush.....	30
Black Vulture.....	75	Spurred Towhee.....	20	American Robin.....	03
Cooper's Hawk.....	30	California Towhee.....	10	Western Robin.....	10
Red-tail Hawk.....	50	Cardinal.....	05	Wheatear.....	10
Gray Sea Eagle.....	2 00	Rose-breasted Grosbeak.....	10	Bluebird.....	02
Merlin.....	30	Black-headed Grosbeak.....	15	Western Bluebird.....	12
Kestrel.....	25	Indigo Bunting.....	08		

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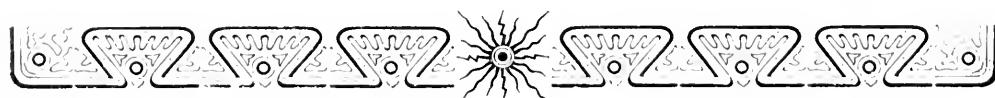
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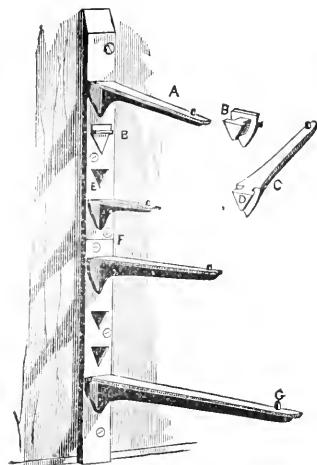


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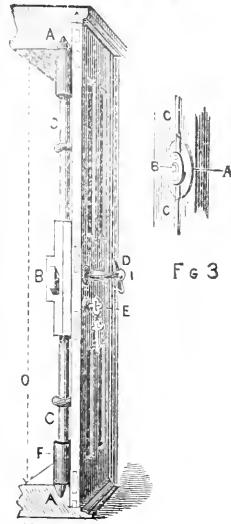


FIG. 2.

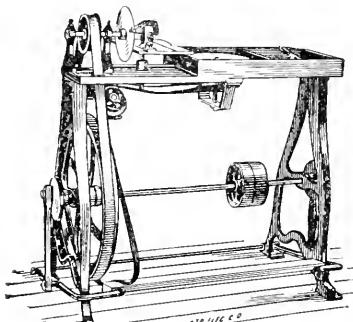


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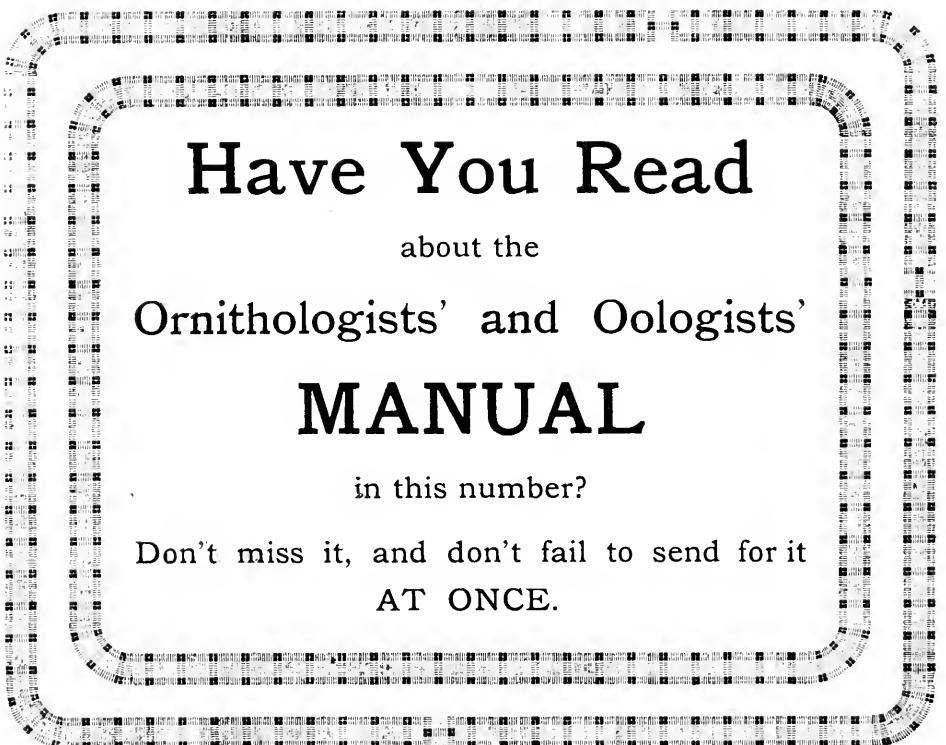
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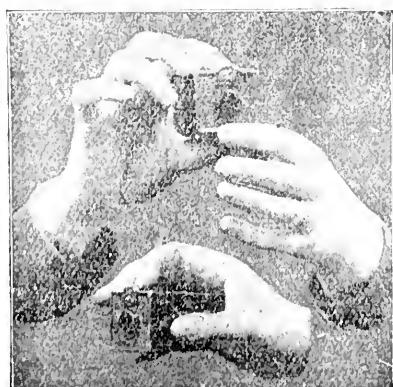
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HABITS OF THE CALIFORNIA CONDOR,

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A Monthly Magazine Devoted to Research in Natural Science.

VOL. I.

ALBION, N. Y., FEBRUARY 15, 1895.

No. 4

ARCTIC NOTES.

On the Habits of certain Rare
Northern Birds in Comman-
der Islands and Kamtska-
tka, by Leonard
Stejneger.

Taken from his excellent report to the U. S. National
Museum, continued from January number.

STELLER'S DUCK

Enicorcta Stelleri.

This duck makes its appearance about the first of November, at which time large flocks were observed, but no specimen was secured before the 20th, although several were shot. They remained all winter about the coast, preferring the rockiest parts and the places where the breakers were most violent. Although very numerous during the winter, in Spring their number was enormously increased and immense flocks covering many acres, could be seen floating on the sea, a quarter to a half mile off the shore, in April. Towards the end of the month they nearly all departed. It doubtless does not breed on the islands, although one egg was recorded in '72 by Prof. Dall.

PACIFIC EIDER.

Somatera v-nigra.

The Pacific Eider is now rather scarce on the Islands. On Copper Island there are at present only a few places where it breeds, but I secured a

a male in perfect plumage, a downy chick and an egg, the latter measuring 70 by 48 mm.

RED-FACED CORMORANT.

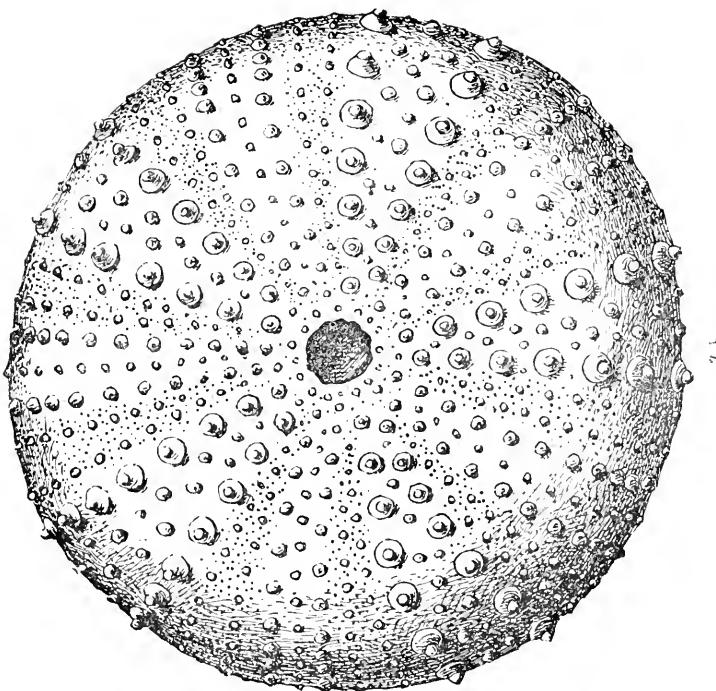
Phalacrocorax urile.

This species breeds on the islands and eggs secured measure 61 by 40 mm, 63.5 by 39, and 66 by 37 mm. These were taken from Copper Island. They cannot be confounded with *pelagicus*, as they are considerably larger, and the green color when looked at through the shell, is totally different, being much more bluish, against yellowish in *pelagicus*.

PELAGIC CORMORANT.

Phalacrocorax pelagicus.

This species rears two broods in a season. This is not to be regarded as a positive statement that the same parents rear two sets of young the same year (although I believe that most of them do) but simply that I have found the colonies of this species having eggs and downy young at two different times. The first season commences early in May, the young of this brood being fully fledged in the latter part of July. In the middle of this month, however, the colonies again contained all stages, from fresh eggs to newly hatched young. During the first days of August, I found downy young of almost the same age and still without feathers, while on the



Strongylocentrotus franciscanus, Mammoth California Purple Urchin. Coast of California.

21st of August, 1882, I visited a numerous colony on Bering Island, in which the oldest young were about half fledged. These would not be able to fly before the first week of September. Between the two periods young in all stages of development will be found in the colonies, but proportionately few in number.

The birds breed on all the most rugged and steep promontories which rise immediately from the sea, as well as on the outlying islets and stones. Most of them winter around the coast, but they are not by far so common at that season as during summer. The eggs measure 56 to 59 mm by 34 to 37 mm. Of a set of three taken, one egg was perfectly clear, the second contained a very small embryo, while the third one contained a somewhat larger foetus.

SNOWY OWL. *Nyctea nyctea.*

The Snowy Owl is now quiet common on Bering Island, although only a few years ago it was regarded as rare. It now feeds on the myriads of mice, and grows exceedingly fat. They remain in the neighborhood of the Village until the beginning of May, on the 2d day of which three individuals were still to be seen. Most of them then retired to the higher mountains in the interior of the southern part, but a few pair breed not far from the sea shore. Thus, for instance, a pair was seen during the whole summer in the neighborhood of the great seal rookery, and on the 3rd of September 1883, a family of five individuals had taken posts close to the road between the rookery and the village. The specimens are rather heavily barred, even the lightest male being very much so.

Notes On the Preparation of Rough Skeletons.

BY FREDERIC A. LUCAS.

IDENTIFICATION OF SPECIMENS.

It is, of course, extremely important to know the correct name of every skeleton, and whenever possible this should be attached to the specimen.

When the animal is unknown, either the skin, roughly taken off, should be kept, or else another specimen made into a skin, in order that it may serve as a means of identifying the skeleton.

LABELS.

Use good *manila* labels, as thin paper is so apt to be torn or defaced. A very good plan is to cut Roman numbers on a bit of wood and let these refer to entries in a note-book.

SELECTION OF SPECIMENS—BREAKAGES.

Where time allows, select a series of skeletons of different ages; but where only one skeleton can be prepared, choose a fully grown, adult animal, as free as possible from breakages. If an animal is shot or trapped it is impossible to avoid breaking some bones, and such must be allowed to pass, but where it has been beaten to death, fracturing the skull and limb bones generally, the animal had better be thrown away at once.

If the skull alone is broken, select if possible another of the same size and send *both* with the body. When convenient send with a broken leg or wing another of the same size, but on no account throw away the fractured limb.

TOOLS.

A knife and a pair of scissors are all

that are absolutely necessary, but if these can be supplemented by one or two steel scrapers, the work will be greatly facilitated.

"ROUGHING OUT." MAMMALS.

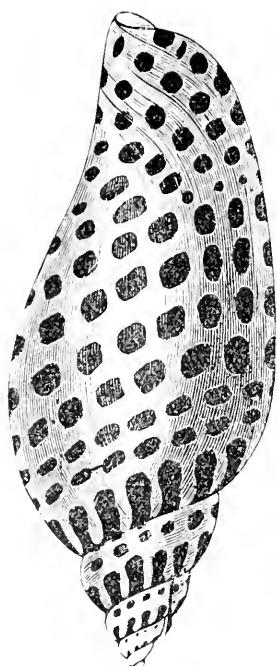
If an animal is rare, the skin should be very carefully taken off and preserved; otherwise, remove the skin roughly and disembowel the specimen, taking care not to cut into the breast-bone, especially the disk-shaped piece of cartilage in which it ends. Animals destined for skeletons should *on no account* be split up the breast as though they were being dressed for market.

Detach the legs from the body and remove the collar-bone or knee pan with the meat. In the cat family the collar bone is very small, and lies loose in the flesh between the shoulder-blade and front end of breast-bone. The collar-bone of weasels is very minute and difficult to find, while, on the other hand, climbing and burrowing animals usually have this bone well developed and uniting the shoulder-blade with the breast-bone.

Deer, antelope, bears and seals have no collar-bone.

In small quadrupeds it will not be necessary to detach the legs, but, whenever convenience in roughing out or packing renders this needful, cut the collar-bone loose from the breast-bone and leave it fastened to the shoulder-blade.

The legs being finished, disjoint and clean the skull. Be careful in removing the eyes not to thrust the point of the knife through the thin portion of the skull back of them, and in deer, antelope, or other ruminants take care not to break through the thin bone at the back end of the upper teeth. Also



Voluta Junonica, a rare species of shell from Florida, at one time worth over \$150.

look out for any projections of bones so as not to cut them off.

Remove as much of the brain as possible with a scraper, bent wire, or small stick.

In cleaning the ribs take care not to cut the cartilages joining them to the breast-bone, and when the tail is reached, look for a few little bones projecting downwards from the first few vertebrae.

If time allows, soak the roughed-out skeleton in water for a day or two to extract the blood; at all events wash thoroughly and brush with a good stiff brush.

Fold the legs snugly along the body, or, if they have been detached, tie them together with the skull on the under side, as much as possible within the chest cavity; also turn down the tail and tie it upon itself.

Roll up in a bit of rag and fasten securely to one of the long bones any bones which may have been detached or any splinters from a broken bone.

Hang up to dry in the shade,* where it will escape dogs, cats, and rats.

Lastly, in case a small skeleton is likely to be some time on the road, give it a very thin coat of arsenical soap to preserve it from the attacks of Demestes and other insects.

SPECIAL POINTS.

Embracing the upper part of the windpipe and connecting it with the base of the skull is a series of bones known as the hyoid apparatus. This should be carefully saved.

There are usually small bones, termed sesamoids, imbeded in the tendons, where they play over the under sides of the toes, and on this account the tendons should never be cut off close to the bone. There are often one or two small bones on the back lower portion of the thigh-bone, and these should be left in place.

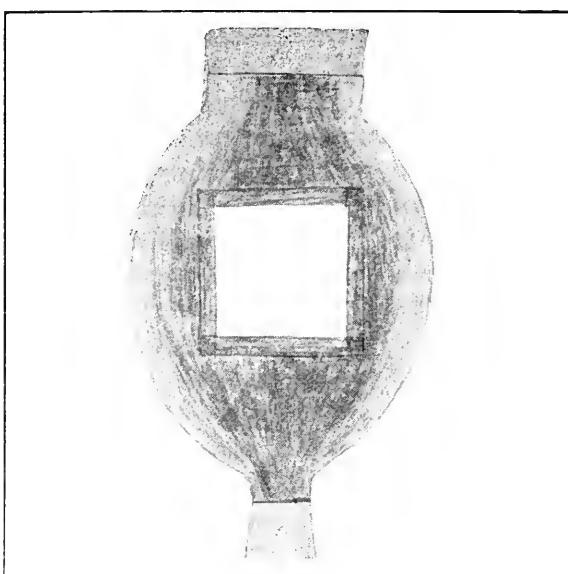
In preparing the skeletons of rabbits particular attention should be given to the shoulder blade, as this has a slender projection at the lower end which extends some distance backward.

The male organ of a great many quadrupeds, as in the raccoon, is provided with a bone. As it is difficult to say when this may or may not be present, it should always be looked for, and when found left attached to the hip-bones.

CONTINUED NEXT MONTH.

Proceedings United States National Museum, 1885.

* In this the collector will necessarily be governed by circumstances, as in moist climates it may be needful to dry a specimen in the sun, or even by the aid of a fire, although this should be done only as a last resort.



A new design for Entomologists collecting and killing bottle. Square glass in sides.

Concretionary Granite.

Vermont is one of the smallest of the United States, being but one hundred and fifty seven miles in length, and having an extreme width of but ninety miles; with an area of but little more than ten thousand square miles. Being one of the oldest of the states, it is popularly supposed that there can be little, or nothing, relating to its geology that is new, or interesting. Yet this is a mistake. I doubt if any locality of no greater area can furnish a greater variety of interesting minerals than the little state of Vermont. There are to be found within its borders upwards of one hundred different simple minerals. These are combined with one another, and in varying proportions, so as to form an almost endless variety. Then many ages ago, Vermont was sunk several hundred feet beneath the surface of the sea, where it remained for centuries. At

length, by the operation of some mysterious force, it was gradually raised until its highest peaks are now more than four thousand feet above the level of the ocean. One result of this submergence is that there are hundreds of seabeaches, scattered over various parts of the state, which is a never failing source of delight to explore.

Still I must admit, that, when the beauty of a specimen is its sole, or chief recommendation, those from Vermont do not, as a whole, occupy a front rank. However, there are many very beautiful varieties of minerals to be found in Vermont, and one, which has not yet been found outside the state, with the exception of a single locality in the town of Stanstead, just across the Canadian border. I refer to Concretionary or Nodular Granite, which is found in its greatest perfection in the town of Craftsbury, in Orleans county and not far from the

heart of South Village. Here the deposit is in the form of huge boulders, some of which are nearly as large as a small house. They are very thickly strewn over the surface of two or three acres, and more thickly scattered over several hundred acres to the south and east of the village.

About the granite itself, merely as granite, there is nothing remarkable. It is highly feldspathic, but lacking in horndblende. It is very white and a little too coarse grained to have much commercial value. What gives this variety its especial interest, is the fact, that, thickly mixed with the contents of the rock are to be found numerous concretions or nodules of black mica. In shape they have the form of a prolate spheroid, the short diameter being about two thirds the length of the longer. They are composed of thin, concentric layers of black mica and quartz, regularly alternating, and, when not exposed to the action of the elements are of a jet black color, contrasting beautifully with the white surface of the granite. In size, they vary from one half of an inch, to two inches in the longest diameter. The surface of the nodules is slightly wrinkled, and they much resemble raisins in a pudding, hence the rock is commonly called "Plumb Pudding Stone." They have also been likened to butternuts and are sometimes called "Petrified Butternuts." The rock is also known as "Butternut Granite."

No satisfactory theory has yet been advanced to explain the manner by which the nodules became incorporated into the substance of the rock. Professor Hitchcock is said to have made the remark, that it was the most difficult problem with which he had ever

grappled. He did not attempt to offer any explanation. The nodules often constitute one third and sometimes as much as one half of the entire substance of the rock, and the general appearance, at first, would give rise to the impression that they had been stirred into the rock at some time when the entire mass was in a plastic state. But a closer inspection dispels this idea for the nodules are all arranged with their longer axes parallel to one another. From this we might infer, that, at some period the rock had been stratified; but, admitting this and admitting, that, owing to the heat, or some other agency, it lost its stratified condition, what is the origin and nature of the nodules?

I have said that the principal deposit of this variety of granite is to be found in Craftsbury. It is said to occur also in the towns of Northfield, Waterbury, Newfane, Proctorsville and Jay in Vermont and at Stanstead in Canada. I have searched for it in several of these towns but without avail. I have seen a specimen said to have been found in Newfane, but it differed from that found at Craftsbury, in that the nodules were larger and much more elongated. In all cases the rock is found only as boulders, which have been transported thither by drift agency. The original location is unknown. Most probably it is situated in the unexplored regions of Central Labrador.

C. O. ORMSBEE,

MONTPELIER, Vt.

Coral.

We frequently read of the tiny coral insect, and its incessant labor, and the wonderful results, in the shape of im-

mense coral islands, which follow; and, from such sketches, without other information, one might infer that the specimens of coral to be found in almost every cabinet, as well as the reefs and islands common in the tropical parts of the ocean, were built the voluntary work of a species of minute insect, and, in imagination, we may see them working, hundreds of feet below the surface, with all the energy which characterizes the labor of the ant in building its own domicile. As a poetical fancy, the idea is exceedingly beautiful; but as a scientific fact it is utterly faldacious. Coral is not produced by any insect, nor is it formed by the *voluntary* action of any animal whatever. It is produced by the involuntary and spontaneous action of an animal organism, and is as essential to the growth, development and protection of that organism, as is the shell to an oyster. With as much proprietary we might give the elephant credit for producing ivory, or praise the sheep for its skill in producing wool. Coral is produced simply because the animal producing it so constructed that it cannot help itself.

Nor is it the production of an insect, but, instead of a class of organisms so low in the scale of nature, that, for centuries, they were supposed to belong to the vegetable, rather than the animal kingdom. Even Linnalus would not class them as animals, although he recognized the fact that they did not belong to the vegetable kingdom; so he invented for them the term Zoophites, which, literally signifies, animals that grow like plants. The term is a misnomer but has come into general use.

The Zoophites which produce the coral comprise several genera, each of

which includes various species, and each species produces a distinct variety of coral but the same general description will apply to all. They are all small, the largest seldom being over half an inch in diameter, and the smallest of microscopic dimensions; but they often grow in colonies, or clusters, and the entire mass is often more than twelve feet in diameter. The zoophite or polyp, as the living organism is called, consists of a cylindrical, sac-like membrane, attached to the rock at the lower end. The upper end is partially open and incloses a second sac, similar, but of smaller dimensions, and which hangs, pendulous, within the larger. The mouth of the sac is surrounded with tentacles, and, when open, the polyp resembles a flower in its general appearance, and is often exquisitely beautiful. The sole object in life of this polyp seems to be to secrete carbonate of lime from the water of the ocean, and to deposit it, as a hard calcareous rock, at the base of the sac.

The polyp reproduces itself in various ways. First by means of eggs which are discharged in immense numbers, and are carried hither and thither by the waves, until, perchance, they are deposited in some favorable locality, when they hatch and the tiny polyp attaches itself to the rock or soil beneath it, and begins its growth. Secondly, by division. At a certain stage in its growth many varieties divide, and each division becomes an independent polyp, although attached to a common base and it, in turn, divides and reproduces others of its kind, and thus the operation goes on indefinitely. This is especially true of the variety known as the brain coral,

so called from a fanciful resemblance to the human brain. Third, by budding. Small bud-like excrescences, branch out from the outer sac, near the point of union with the calcareous matter which it has deposited, and to which they attach themselves, and thus form independent polyps. Besides, if any portion of the living polyp be broken from the parent stock, it may take root and grow, and from a nucleus for a new colony.

The coral polyp cannot live at the surface, nor at a depth of more than one hundred feet, nor in water the temperature of which is less than sixty-eight degrees above zero. Specimens of coral, however, are found in all parts of the world and at various elevations, both above and below the sea level, thus showing that neither the temperature, nor elevation is the same now that it has been at various periods of the world's history. It is even claimed by some, (and the advocates of this theory number some of the most eminent geologists,) that the limestone rocks of the St. Lawrence valley, and of the upper part of the Missouri river, and in New Jersey, and a few other places are but coral formations which have been metamorphosed by the action of heat. The hypothesis is rather bold, but not at all improbable. In the South Pacific Ocean, coral has been taken from the rocks at a depth of more than twelve hundred feet; it is, however, never found, in this region, at a greater elevation than it could have been thrown by the waves. This demonstrates that the islands in that locality have slowly settled, and adds another link to the chain of evidence which connects the Pacific Archipelago with an extensive continent which

formerly occupied that portion of the globe.

In general appearance coral islands much resemble one another. They are all level, and raised but a few feet above the surface of the ocean. They invariably rest upon the top of a submerged mountain, which they generally encircle; and they reproduce to a certain extent the contour of their base. Generally they are in the shape of a circle, more or less elongated, and inclose, within the ring, a shallow body of water which is termed a lagoon. Sometimes, however, the lagoon becomes filled and the whole constitutes a single, circular island. Then, too, the surrounding circle is often broken, sometimes into numerous pieces, so that, instead of a ring surrounding a lagoon, there may be hundreds of little islands. This is especially noticeable in the Maldive Archipelago, whose chief styles himself, "Sultan of Twelve Thousand Islands." The flora of a coral island numbers but a very few species, and its fauna, still fewer. Its soil is composed almost wholly of carbonate of lime, sometimes covered with a deposit of decayed vegetable matter.

The tendency of the polyp is to grow upward, but, when it reaches the surface it is obliged to turn, and, growing laterally, it forms huge, overhanging masses, which are broken off by the waves, and thrown upon the top of the formation. This is repeated, again and again, until an island, ten or twelve feet above the surface of the ocean, has been formed. Gradually sea-weed, and other organic substances, are thrown upon the island by the action of the waves, and these, decaying, become mixed with the calcareous.

sand which the elements have ground from the coral, and, at length a soil is formed which is capable of sustaining vegetable life. Then seeds of some hardy plant are transported thither. They may be carried in the stomach of birds, or blown by the wind, or drifted by marine currents; but they reach the island and germinate, and, in a brief period, under the influence of a tropical climate, the island teems with vegetable life. Next, birds flock to its shores, for breeding purposes, and remain to live. Various amphibia are attracted thither. Insects and birds less powerful of wing are blown by winds from neighboring islands and find a refuge. And, finally, certain mammals may be and sometimes are, drifted by the sea currents to these islands. Thus, by the slow action of nature, the islands eventually become populated.

Often coral islands, instead of surrounding empty lagoons, encircle islands. In this case, although their method of formation is the same, they are termed coral reefs. If they occur near the shore, they are called fringing reefs; and, if distant, the name of barrier reefs has been given to them. Some of the barrier reefs are of immense extent. Thus, along the north-east coast of Australia, there is a chain of barrier reefs, extending, in an almost unbroken line, for a distance of twelve hundred miles. In but few places is this reef more than thirty miles distant from the shore. The water in the channel between the reef and the shore is seldom more than one hundred and fifty feet deep; but, outside the reef it suddenly deepens to nearly twelve thousand feet. Within the channel the largest ship might sail, for

more than one thousand miles within sight of land on either side; and, in fact it would be next to impossible for it to leave the channel until its end was reached.

From the fact that the coral islands are constantly increasing in size and number, the statement has been made, that, in the course of time, the South Pacific Islands will be united and form a vast continent; and, that, when man has, by his extravagance, wasted the resources which the world now offers him, the new continent will be ready for his occupancy. As a poetical sentiment, or a moral reflection, it is a beautiful idea; but it is one that can never be realized. Even were there no physical conditions to prevent, there is not enough lime on the whole face of the globe to form the basis of such a mass of coral. Neither is such an event desirable; for a country with but a single kind of soil, without minerals other than lime without metals, lying so near the level of the sea, with little or no chance for drainage, and no change of scenery or climate, does not offer any peculiar advantages to the civilization of the present day.

On the Preparation of Mammal Skins for Study.

For the study of mammals a collection of specimens is not only desirable but is indispensable. Before a mammal is in any shape to be used as a specimen of a certain species, it will be necessary to spend sometime in its preparation. The collector will have to practice great care from the time he goes into the field until he lays the prepared specimen in the cabinet.

Among the many reasons for always making up a neat specimen, we wish to

emphasize the following. Many characters can be shown only by perfectly prepared material.

The student will soon want to collect from places distant to his immediate locality. One of the best ways to do this is by means of exchange. He will at once have to deal with the fastidious collector and the only way to do business with that gentleman is to send him good specimens.

A nicely prepared specimen will always be more carefully handled. It will be apt to be preserved for a long time and may continue to be useful long after the collector has ceased to be.

It is generally conceded that a *skin* is much more useful and convenient for study, than is a mounted specimen. A skin can be made in much less time, can be stored in a smaller space, can be examined more readily and is more easily packed for shipment. However this may be a poorly mounted specimen is much worse than a good skin. Most of us can learn to make a presentable skin, while but few of us will become expert taxidermists.

That a skin shall be first class, several points in its preparation must be observed.

First of all, it must be thoroughly cured and well poisoned.

It must be accompanied by the skull.

A label must be attached to it, which, among other things must bear the record of certain carefully made measurements.

It must be well made, shapely and clean.

When you catch your mammal do it in such a way that the skull bones and teeth will not be injured.*

It is best not to begin work on the

specimen until it has lost its animal heat. Stretch the body out, move the legs and body to get rid of the stiffness, and take the measurement as indicated farther on. Record the measurements in millimeters, not in inches.

The first measurement is the *length*. This is from the tip of the nose to the end of the last tail vertebra. (Length of body and tail.) Stick a pin in the table. Let the nose touch it. Stretch out the tail and stick another pin in the table just at the end of the tail vertebra. Measure the distance between the pins.

The second measurement is that of the tail. Lay the animal on its ventral surface. Raise the tail vertical to the body. Measure from the base of the tail to the tip of the last tail vertebra. A pair of dividers will be found necessary.

The third measurement is that of the *leg*. With the dividers measure the distance on the leg from the end of the "heel" (calcaneum) to the tip of the longest claw.

The fourth measurement is that of the *ear*. With the dividers get the distance from the tip to the crown of the head. The hairs are not to be measured. Now, when you have done the measuring and noted the sex you are ready to write the label. The label may be of any size and shape to please your fancy. Only don't have it large enough to wrap the specimen in. Make it of strong paper and write it with waterproof India ink. The label should bear your name, the name

* For future papers, we wish to reserve our notes on various modes of capturing small mammals. In the meantime we shall be pleased to read any notes on traps or other contrivances that would be of use to the collector. Notes on baits or on the food of certain mammals would be very interesting.

of the specimen, the sex, your catalogue number, the date, locality, measurements, and anything else of interest. Let me suggest a size and pattern.

Collection of JAMES D. BROOKS.

364. *Tamias striatus*. Female.
Waterloo, De Kalb Co., Ind. Aug. 12, 1890.

239. 97. 35. 16.

Pouches full of maple seeds.

The above figure shows both sides of the label. A string may be passed through holes in the end (the two dots :) and the label securely tied to the left leg of the specimen.

When you have prepared a label similar to the above, you are ready to skin the mammal. Not before. If measuring and cataloguing are too much trouble, throw the specimen away and spend your time on something else.

Lay the mammal on its back. Extend an incision along the median ventral surface from a point posterior to the arms, to the vent. The opening must be large enough for the body to pass through. Loosen the skin as far down on each side as possible. It should also be loosened around each leg. The legs may then be pulled up and the skin pushed down to the toes. If it is more convenient, the legs may be cut off before they are skinned. The greater part of the tibia * as well as the bones distal to it should be left attached to the skin. All flesh should be carefully removed from them. Cut across the vent and loosen the skin all

around the base of the tail. Remove the tail from the skin. Should there be much fat on the skin of the tail, the tail will have to be split, and the fat removed. Turn the skin backward. Treat the arms much as you did the legs, leaving the bones distal to the humerus attached to the skin. Carefully cut the skin around the teeth.

Every particle of fat and other tissue must now be carefully removed from the skin. If the least bit of fat remains it will surely give you trouble.

Sew the mouth shut from the inside.

The preservation * † should now be applied. Be sure that every part is well poisoned. Be careful to get the poison down to the fingers and toes and also the entire length of the tail.

If you are preparing a large skin it may be treated with salt and alum and left over night. It should then be wiped dry and poisoned.

If the skin is a small one, it should be stuffed with cotton. Stuff the head quite full. Put less in the neck. Fill the shoulders full, stuff the legs and put enough to round up the hips. Stuff the hind legs. Insert a wire, carefully wrapped with cotton, clear to the end of the tail. The wire should be long enough to extend some distance into the body and should be of annealed iron. Write a label on parchment, bearing at least your name and catalogue number: it is best to

* A mixture of three parts arsenic to one of alum is perhaps the best preservative to use. The skin will dry more quickly than if arsenical soap is used.

† The skin may now be thrown into a strong solution of salt and alum and left until you have more time or a better opportunity to complete it. Use no saltpeter. It will decalcify the bones and ruin the skin.

* "Osteology of the Mammalia;" Flower, will be found to be very useful.

have the entire data on it) and tuck it into the skin, carefully sew up same.

Should the skin be a very large one; a body of excelsior should be made. Wires should be employed to support the legs.

In shape, the skin should now roughly resemble the freshly killed mammal.

Lay the skin on its ventral surface, securely tie the label to its left leg. (In case this label should ever be lost the one inside the skin may be referred to.) Extend the arms of the skin forward by the sides of the head, palms of hands downward. Pins stuck in the drying-board along the sides of the arms will keep them in place. Bend the tail so that it will lie flat on the board. Fasten it down with pins. Extend the legs backward, with the feet near the tail. Pin in position.*

Cut the head off at the junction of the first vertebra and skull. Remove the brain through the large foramen. Remove the large muscles, the tongue and the eyes, but don't dare to cut or break the least bit of bone. Tie a label (one made of sheet tin is best) bearing the catalogue number of the skin, to the skull. Let the skull remain for several days in clean water, to remove the blood. Then dry the skull. The skull may be at any time more completely cleaned and carefully labeled with India ink. For exchange skins, the skulls should be only roughly cleaned.

The first specimen that you put up may not look so well as you may wish. But patience and practice will work wonders.

Nesting of the White-tailed Kite.

In the latter part of May, 1894 a friend named Bennett and myself started off on a week's hunting trip for eggs.

We took the train at San Francisco and went some hundred and forty odd mile; south to San Bonito County which is a regular paradise for egg collectors.

We arrived at our destination about noon and after a good lunch started out. We followed the Pajaro (pronounced Paharow) river up for about two miles, when we came to a pretty little flat covered with immense live oak trees and a few dead willows.

In the first willow we came too we took a fine set of Nuttall's Woodpecker 1-5 and no sooner had them packed, when I caught sight of a Kite hovering over the largest tree in the flat. Bennett and myself made a break for the tree, but as I had on a heavy pair of borrowed boots, which were three sizes too large for me he got there first, myself pulling up a close second.

After walking around the tree a number of times I saw what I took to be an old California Jay's nest, but as it was the only one in the tree I went up. The climb was a terror. Talk about your big sycamores, why they weren't in it for a minute, but at last I managed to get up.

When I got within three feet of the nest the Kite flew off and I was reward for my climb with a beautiful set of four eggs.

The eggs were the prettiest ones I ever saw, no two were alike. One was marked all over with reddish brown, the next was only marked with a heavy red blotch on the side on a pure white background, the next was marked the heaviest on the large end, and the next the heaviest on the small end.

The nest was built of small sticks and grass, and lined with green leaves and was about 18 inches in diameter.

Both birds hung around the tree for two or three days, but as we had to move we did not observe them any further.

Mr. Taylor took a set of five from the same birds about May 1, 1894 and the whole set was very heavily marked.

HAROLD WARD.

THE MUSEUM.

A Monthly Magazine devoted to Ornithology, Oology, Mollusca, Echinodermata, Mineralogy and Allied Sciences.

**Walter F. Webb, Editor and Pub'r,
Albion, N. Y.**

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**WALTER F. WEBB,
ALBION, ORLEANS CO., N. Y.**

NOTES.

The heavy storm that has prevailed during the middle of February throughout all the East, caught the editor of The Museum many hundred miles from home, and while he does not hesitate to take any ordinary tramp, it was deemed best to wait until trains were set moving again, hence the slight delay in this month's issue. We had the pleasure of a hurried trip, through New England, visiting Worcester with its famous "Reed," Boston with its noted Taxiderinists and Natural History Stores, Hyde Park, the home of "The O. & O.," Providence, the headquarters of Southwick & Critchley, New York City, the center of trade, and Philadelphia,

with its horde of Collectors and Dealers. Space will not permit us to mention the many pleasant but hurried visits with collectors and dealers, but we feel free in saying that '95 bids fair to far overlap any previous year in research and study and we look forward to handling a finer line of material than ever before placed on the market.

We are in receipt of a tasty little manual entitled, "Constitution and By-Laws of the Cooper Ornithological Club of California, founded June 22, 1893." From the handwriting, we fancy we are indebted to our genial friend Mr. Barlow, of Santa Clara.

Prof. C. E. Dionne, of Laval University, Quebec, Can., reports securing an albino Canadian Ruffed Grouse (*Bonasa umbellus togata*.) The specimen is pure white with very few feathers of normal color on the upper parts. The tail has only two colored feathers, the rest being snowy white. Mr. Dionne has a very fine collection of Albinoes. In this connection, we would also state, that we have just secured a fair specimen of a Pure White Muskrat, which was taken in Canada some years ago, but I believe has never been put on record.

Canton, Ohio, Dec. 27, 1894.

Mr. W. F. Webb, Albion, N. Y.

Dear Sir:—Allow me to thank you for the first and second issues of THE MUSEUM, you so kindly sent me. I am well pleased with its appearance and valuable contents.

Enclosed please find draft \$2.00 for which mail me THE MUSEUM for one year, and the following premium. * * * *

Yours Very Truly,
A. HOFFER.

Notes on Whistling Swan.*Olor columbianus.*

Although one of the largest of the game birds of the world, it seems strange that so few articles are written on its habits, etc. Perhaps it is because few Ornithologists have the good fortune to observe these birds in their haunts. Surely much more can this bird claim space in the columns of our interesting magazines than the miserable little English Sparrow, although articles on the latter are by far the more common.

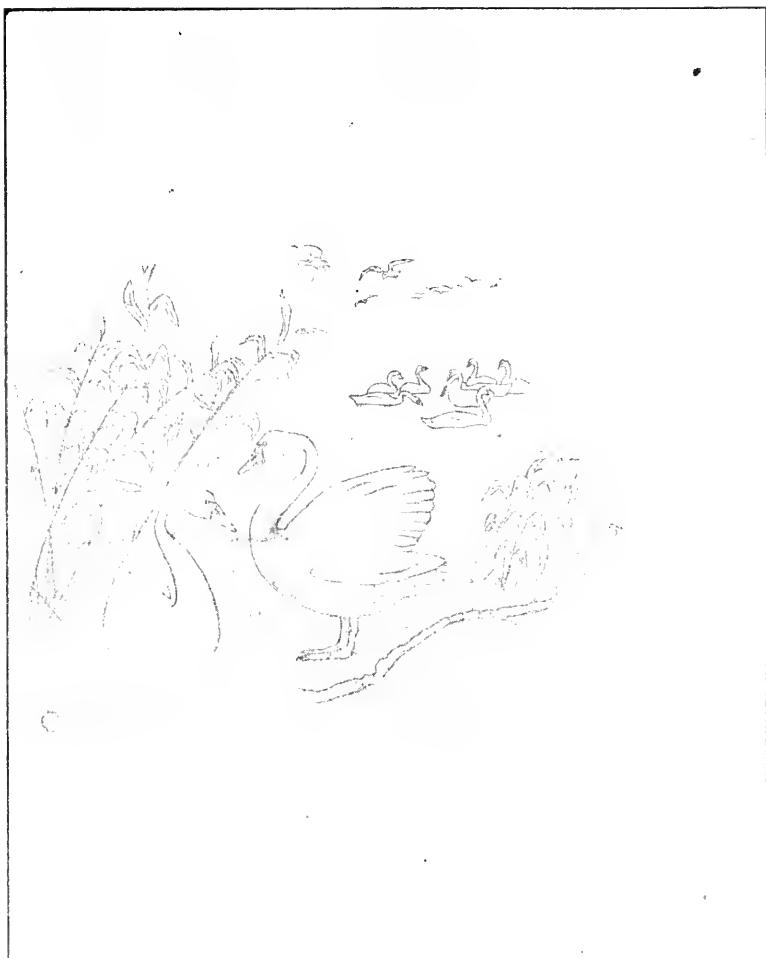
It was in the winter of '93, I had the pleasure of observing and collecting specimens of this handsome bird. Certainly (Beautiful) will not express ones thoughts as you look on a large flock Swans lying some distance off shore. I first saw them on Galveston Bay on January 1st, and observed them every day until March 20th,* when there seemed to be but a very few left, all remaining on that date I think were crippled birds, being unable to stand the fatigue in their long journey to the north. It is a great sight to watch a flock of these birds assembled on the water, curling their long necks around each other, all making a strange honking noise, peculiar to themselves. This they continue for some time, then all turn with military precision and form in line; when they swim up and down the coast, each proudly swaying their heads from side to side. In this manner they spend most of the bright days. They can be easily seen far out on the bay, their large white bodies glistening

in the sun, as the restless waves toss their cork like forms above the level of the water. At first sight I could not distinguish whether the silvery spots rising on the waves were Swans or the water breaking over some treacherous sand-bar, which are common both in Galveston and Sanjacinto Bays. Each day as the sun begins to go down they turn and slowly approach the shore, each keeping a sharp lookout ahead. If frightened any way they will either turn and swim quietly away or all take wing and survey the country for miles around before they will again settle on the water. Often small flocks may be seen in company with Ducks, Geese, Pelicans and Gulls, but usually they will be found alone at some distance from all other birds, as well as human habitation. They are very hard to approach on a bright day, and hunting for them in clear weather is like fishing for Trout in a thunder storm. The dense fogs which prevail along the coast are no doubt the worst enemies these birds have, for then if the hunter is careful he can approach within easy range before they attempt to escape.

In stormy weather they are very restless and are continually flying from place to place as if hunting for a quiet spot, where they may rest in peace till the storm passes. In this continuous change of positions they often come too near the shore and many are killed by the hunters who lay hidden, awaiting their approach. I once saw five of these large birds killed at a single discharge of a heavy double gun.

While on the wing these birds are very graceful, and by no means slow, judging from the ease with which they can rise from the water and depart. I

*These birds breed in the far north, common on islands in Franklin Bay, and also at the mouth of the Yukon River.



think they can equal the speed of many of our ducks. Native hunters kill them for their feathers and down. First the feathers are plucked off of the body, the skin is removed with the down. This is sold for trimmings, or made into mats and is very handsome. I was told the flesh made excellent eating and I vowed I would satisfy myself as to the truth of the statement, so I, being my own cook, and having nobody to satisfy but myself, procured a fine large specimen and undertook to boil it. For twenty hours it cooked, but on examination I found it too tough for me

to attempt to eat. As my only kettle was in use, and my supply of food was getting low, I took a vote, and of course the majority ruled, so taking one of the most delicate morsels from the pot to chew on till I could boil some potatoes. I gave *Olor columbianus* the exit out of the window. This was enough for me, and I never tried to cook another, and now I had much rather see the birds enjoy themselves on the water than have them take the place of our domestic fowl at the festive board. I have often watched them congregate just before

dark on the low-lying islands along the Galveston Bay coast, where they could rest partly concealed by the dense growth of flags and wild cane, but before Old Sol appeared in the East, all would be far out on the Bay, at a safe distance from the hunter. Old fishermen told me they often catch them on their night lines set for the Sea Cat. I once saw a large bird captured by a man on the prairie. It was in a heavy fog, and the bird had settled to the ground close to a wire fence. I soon frightened it and as the large fellow rose he apparently did not see the wires ahead, and in an instant he turned a double somersault across the road. A man (being close at hand) immediately gave chase and before the bird could regain his feet he was captured and carried home. Of course this was a very unusual occurrence and seldom if ever repeated. The adult birds entire plumage is snowy white. They can be invariably identified by the yellow spot on the bill in front of the eye. Many specimens I examined, this blotch was entirely wanting, but these were without doubt, young, that had not yet obtained their plumage. These also had the wash of brown on the head and neck, often extending nearly to the body. All specimens examined tally very closely (both in measurements and plumage) to the description given in Dr. Coues excellent work on the birds of North America.

NATHAN L. DAVIS,

Feb. 195. Brockport, N. Y.

Ritzville, Wash., Jan 1, 1895.

Walter F. Webb, Albion, N. Y.

Dear Sir: Sample copies, Nos. 1 and 2 of THE MUSEUM received. Thanks, I am well pleased with it and wish you success and a Happy New Year. Enclosed find money order for one dollar for my subscription for 1895.

Yours Truly,
FRANK STAUFFER.

American Dipper.

Cinclus mexicanus.

This bird is found along the mountain ranges of the Pacific coast, generally well back in the foot hills and mountains proper. Back in the dark, and deep recesses of small mountain streams you will find this lively and melodious songster.

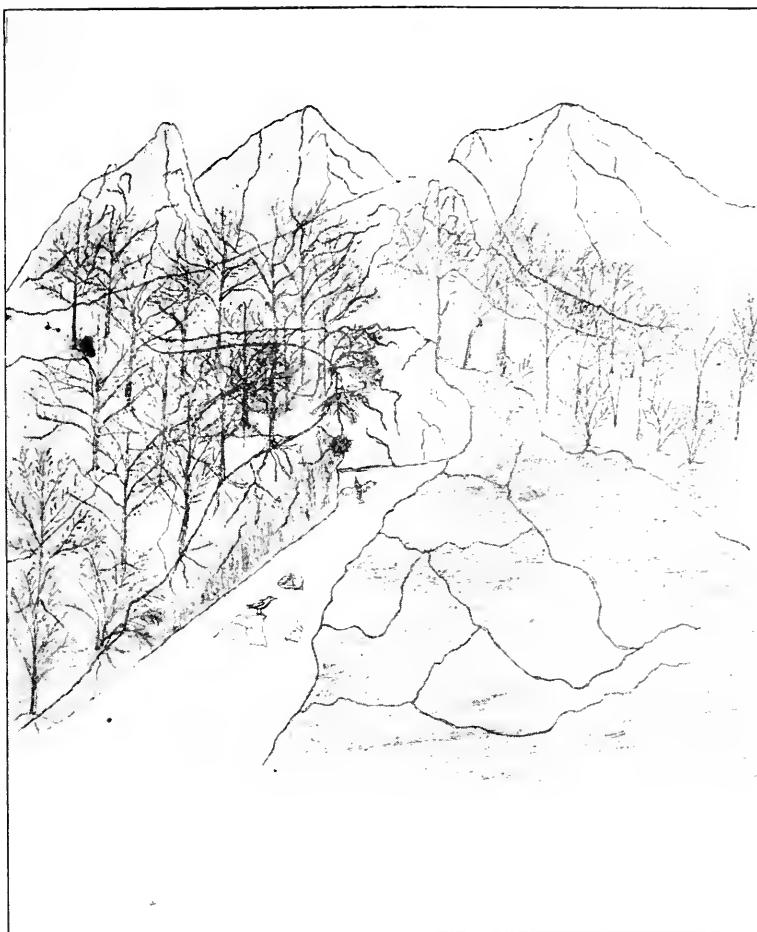
The entire bird is of a grayish slate color and measures six inches in length. Length of tail one and one half inches, which is generally elevated at an angle of 45° when the bird is standing. Length of wing, three inches. Bill $\frac{5}{8}$. Iris brown in color. Feet nearly black.

The American dipper is found in all the wild mountain streams of the Cascade range. Where swift waters splash and tumble against the innumerable rocks and are dashed into spray. Here is where it loves to roam, and can be seen, standing upon a rock bobbing up and down similar to a Sand-piper.

It seems to be at home in the water as well as out, and although not web-footed it is an expert swimmer and I have often seen it dive beneath the surface of the water, coming up at a distance of several yards.

I well remember a circumstance of this character in my efforts to secure a specimen.

It was on the Santiam river near Sweet Home. Just below the town, a deep gorge where the river flows between perpendicular rocks, sixty feet high, I saw a dipper, and firing, I looked for my bird but none was to be seen. Looking on the opposite bank just then I saw my bird. Firing again I then watched my bird and saw him



dive beneath the waters coming up about fifteen yards up stream.

I fired several shots at random and each time the bird would dive coming up, either up or down stream or on the opposite side.

I have often seen this bird allow the swift waters to wash it off some rock, and float down with the current, until another suitable rock presented itself for a perch. It is most often found just below a water-fall.

It appears to be fearless of man and often it will come within a few feet of you and sing its beautiful song, which is clear and sweet. It would be hard

to describe, and one must hear it to be able to appreciate its beautiful notes, which it utters most frequently, while flying up or down the stream, keeping close to the surface of the water and fairly making the canon echo with its vibrations.

Its nesting place and nest is in full harmony, with the wild and glorious mountain scenery.

It is built in some crevice of the rocks, or upon a rock in the stream or dead log lying out in the stream. It is made of sticks and coarse grass, in the shape of a dome, which is in turn covered with mud and then a coat of

of moss. It is always placed where the spray of rushing waters will keep it damp, and the moss soon takes root and grows. Its size is from 10 to 14 inches long, and eight to ten inches high, and about the same in width. When placed against the moss covered rocks or logs, it cannot be told from a tuft of moss except by a practiced eye. The entrance is on the side and generally a little below the center. Inside the nest is dry and warm.

It has been my pleasure to examine several nests, and it might be of interest to mention a few, (a) May 1, '91 Contained 3 slightly incubated eggs, pure white, and measured 1.01 x 74, 1.00 x 73, 1.01 x 73. Placed on a beam of an old deserted saw mill, so situated that the spray and flowing water kept the nest very wet outside. In order for the bird to reach the nest proper, she must pass upward and back. The lining of nest was moss and dry grass. Size of nest, length, 12 inches, width, 11 inches, height, 7½ inches, (On exhibition Nat. Mus.)

(B) Found May 4, '91, containing 3 young. The nest was placed on side of perpendicular rocks, about four feet from surface of water and sixteen feet from the top of cliff and was only accessable by lowering one over the cliff by a rope.

(C) Found May 10, '93, in the center of a stream on a dead log, containing 4 fresh eggs. Nest similar to those already described, but situated just below a heavy water fall. It will thus be seen that the time of nesting is from April 15 to May 15.

This bird will return and use the same nest year after year and I might

add that it is a constant resident of these parts.

What a pleasure it is for one to wander up and down these mountain streams, catching trout and finding an occassional nest of the American Dipper, to vary the monotony of such an occasion.

Much more might be said, but fearing the editor's wrath I will desist.

A. G. PRILL, M. D.

Winter Birds.

The town of Boonville, N. Y., lies on the northern border of Oneida County. Here in winter the snow piles up to the depth of several feet, and the mercury is constantly struggling to condense itself into as small a space as possible. A few winters ago, for three continuous weeks, the thermometer registered below ten degrees below zero. Notwithstanding our frigid climate, the birds do not all desert us at winter.

I have compiled the following list of our winter visitants and residents, known by us to visit this town.

Several species not included in this list have been observed near here, and undoubtedly a few visit the town of which I have no knowledge.

1 *Uria lomvia*. Brunnich's Murre. One captured in the southern part of the town, December 5th last. One also taken near the same place the middle of the month, and one near Utica the 24th. These, I believe are the only birds from the family Alcidae taken in Oneida county.

2 *Bonasa umbellus*. Ruffed Grouse. Remain here during the winter.

3 *Haliaeetus leucocephalus*. Bald

Eagle. One brought in town the last of November.

4 *Asio wilsonianus*. Long-eared Owl. Occasionally taken.

5 *Syrnium nebulosum*. Barred Owl. Comparatively common in winter.

6 *Nyctala acadica*. Saw-whet Owl. Several seen each winter.

7 *Migascops asio*. Screech Owl. The best known, if not the most common, of our owls.

8 *Bubo virginianus*. Great Horned Owl. Not Uncommon.

9 *Nyctea nyctea*. Snowy Owl. Occasionally seen.

10 *Dryobates villosus*. Hairy Woodpecker. Not common, but occasionally seen in winter.

11 *Dryobates pubescens*. Downy Woodpecker. Common.

12 *Ceophlocus pileatus*. Pileated Woodpecker. Several killed here each winter.

13 *Melanerpes erythrocephalus*. Red-headed Woodpecker. A few remain throughout the year.

14 *Cyanocitta cristata*. Blue Jay. Some winters this species is very abundant. Other winters few are seen.

15 *Corvus americanus*. Crow. A few seen during the winter.

16 *Pinicola enucleator*. Pine Grosbeak. Abundant some years, then, perhaps for several years few are seen.

17 *Loxia leucoptera*. White-winged Crossbill. Occasionally seen.

18. *Spinus tristis* American Goldfinch. Occurs in flocks.

19 *Plectrophenax nivalis*. Snowflake. Not uncommon.

20 *Passer domesticus*. English Sparrow. Remarks superfluous.

21 *Lanius borealis*. Northern Shrike. Common.

22 *Certhia familiaris americana*. Brown Creeper. Not Uncommon.

23 *Sitta carolinensis*. White-breasted Nuthatch. Abundant.

24 *Sitta canadensis*. Red-breasted Nuthatch. Not uncommon.

25. *Parus articapillus*. Chickadee. Abundant.

W. S. JOHNSON.

January 25, 1895.

Notes on the Nesting of the Chuck-will's-widow.

These large and interesting goat-suckers arrive in Knox Co., Tenn. about the middle of April and their notes so nearly resembling those of the Whip-poor-will, may be heard almost any evening after that time.

Like the rest of the family these birds are of a very retiring nature and their notes are much more familiar than their form, in that respect reminding one of the European Cuckoo.

I have never seen one outside of dense woods during the breeding season, though later I have noticed one or two specimens on the outskirt of the city, flying invariably low and rising at each fence or other obstruction in search of their favorite insects.

The best time to closely observe this species is in nesting time when they are very fearless. If I understood the art of photography and possessed a camera, I could have presented the MUSEUM readers with a picture of male, female, nesting site and young on one occasion as they remain within a few feet of their young at all hazards, displaying a remarkable parental devotion.

The Chuck-will's-widow, nests on

the ground on the outskirt of retiring woods, generally choosing rather high sloping ground and almost invariably with a fence, log, or scrub growth, as a background. The female while incubating always faces the most open space, which is generally down hill to facilitate leaving the nesting site when disturbed. The eggs are laid on a leafy bed, without another household furnishing, and are apparently without any previous preparation and are generally parallel and touching each other.

Two eggs constitutes a full set.

It is almost impossible to find the nest of this species unless the female is flushed from her eggs, unless a great disturbance is made she will not fly until the intruder is within a few feet of her, then noiselessly like a shadow she sails near the ground into the wood perhaps thirty feet away generally joining her mate who is never far away in the day time. Should there be young both male and female will utter a strange gutteral scream (if there is such a thing) and fly around the intruder almost touching him, then settle on some low limb or sapling and peer and fidget around with the greatest show of anxiety then again screaming on the wing and repeating the process and should you dare to handle the young (which by the way are exceedingly interesting little lumps of barbed down likewise very pugnacious) such sacrifice calls forth a shower of wings and screams with such assiduity, that one is tempted to cry halt and leave the interesting youngsters to their more natural protectors.

The young have an instinctive feeling of danger and it is really amusing to see them stand on their diminutive toes and open their enormous mouths,

the while flapping their half developed wings in short, striving their utmost to frighten the intruder out of existence.

The eggs are *not* clear crystal white normally, as I have known authorities to state more than once, but of a rich pinkish cream color, as those who have taken them well know. They quickly fade, however to a nearly pure white, after being blown a week or too, even when kept in the dark drawers of a cabinet. Some fade as quickly again as others.

The markings, size and shape vary greatly sometimes. The usual markings being of a clouded lavender of varying density. Sometimes this alone diffused more or less over the entire surface again.

The same marbling of lavender with small spots and blotches of umber in irregular and uneven quantity and again bold deep spots of greenish tinted brown.

The average size of those I have taken is 1.43x1.05.

They are generally elliptical in shape, though sometimes they have a decided small end. In general appearance they are a handsome egg and though rather light in color are not easily found. I have sometimes experienced great difficulty in locating the eggs after flushing the bird not ten feet from me.

The great drawback (as in many other instances) is finding and mentally recording the first nesting site with surroundings, this lessens the difficulty of future finds fully one-half. The first nest I ever saw was found by my young and nature-loving wife, as we were walking through a forty acre patch of assorted trees one evening in May '91, on the "qui vive" for anything of interest. She saw both birds fly from a

bed of leaves near a stump with a growth of vines around it, and not thinking of "caprimulgidae" called to me and stated that two large owls of brown color and spotted, had flown from specified location, and that Carlo the dog had chased them. I concluded at once what they were and explained matters. In a few seconds my wife was scolding the dog for nearly treading on a set of two fresh eggs of this species. I was delighted as I have often searched in vain for them; since then however, I have not had much trouble in finding a few sets each successive season. I have never found a set of eggs nearer than half a mile from the nest and I rarely found any other birds nesting in the immediate vicinity with this species. Country people call them Whip-poor-will when they hear them, but the Nighthawk receives that name when in sight.

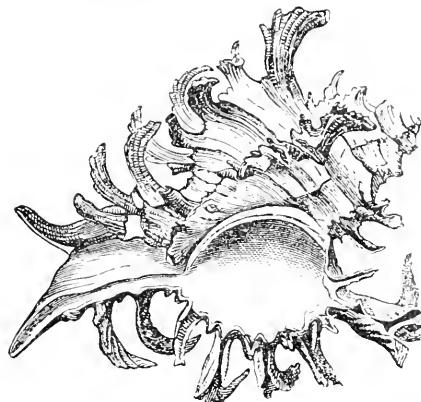
Much has been said about these birds removing their eggs when disturbed.

I once found two eggs in the process of hatching and as one had a remarkably small end and an unusual amount of coloring, I shook the chick out of the already fractured egg, and saved the shell for reference. I located the spot exactly, intending to call again; but on my second visit with an interested friend only two days later, they were gone and though we searched in the most likely nooks, I failed to make the second call. The old nesting site was quite discernable and undisturbed, and I have no doubt that the parents removed the remaining egg and young bird by means of their capacious mouths which in my opinion is the most accessible organ for that purpose. If an opportunity arises, I intend to try and

certify that supposition during the coming season.

As they generally commence laying about the middle of May when out door life has so many charms, it would be a delightful occupation to find and disturb a nest then leisurely retire and enjoy a quiet smoke, while patiently watching the proceedings of the birds and deciding one more interesting point in Oology and Ornithology.

WILLIAM W. WAKE,
Knoxville, Tenn.



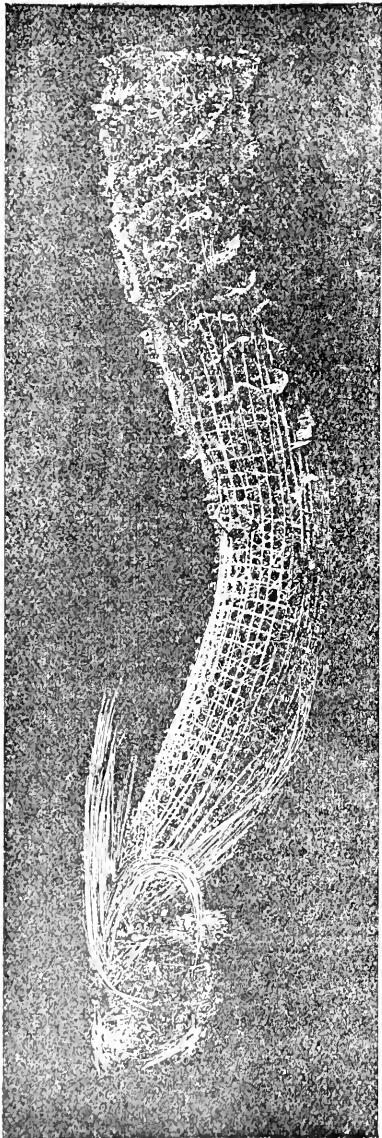
Murex edivia, a fine species from Phillipines.

My Honeymoon.

We were married on Christmas day, in Grand Forks, N. Dak. Just a quiet family affair, and as money was not as plentiful as hard work, my wife said to wait until spring and she would go with me on a collecting trip, as nothing would suit one of my calling better. We just stayed at home and prepared for our summer outing.

We started April 4th for Larimore where my team and outfit were. After fixing tent, wagon, boats and everything in good shape we waited eleven days for good weather.

May 3d we started on our trip. The



Euplectella aspergillum, or Venus Flower Basket, Venus Coral or Glass Sponge from Phillipines.

outfit consisted of a heavy team of horses on the big covered wagon (called the Ark) loaded clear to the top, a light team on a platform spring wagon with the two boats, (the boats were a 14 foot stiff canvass and a ten foot

folding canvass canoe) a single horse to the buggy for myself and wife.

It was a grand morning, clear, and cool with a nice breeze blowing as it almost always does in this country. That day we drove 20 miles to some small lakes where camp was made and the hard work of collecting began.

From my notes taken that day they read as follows:

The hounds had two good runs after Jack rabbits, caught one and lost the other.

(I had a pair of Grey hounds, an Irish water spaniel and a Gordon setter.)

I found the nest of a Gadwell Duck with seven eggs, a Pintail with three eggs, shot male and female Gadwell and male Sandhill Crane; made up the skins and blew the eggs before dark, and made up camp in the "Ark". It was the first time my wife had ever slept out of doors.

At 5 a. m. I started out for a hunt before breakfast. Shot six Ducks, three good Redheads for skins, and three Blue-wing Teal to eat. When I returned to camp I found breakfast waiting for me to come in.

My wife had just completed her toilet (under difficulties) and after breakfasting we started at 7:30. Traveling on west until 11:30, we arrived at Stump Lake, 35 miles west of Larimore, and 65 west of Grand Forks. Here we expected to stay most of the summer as it was my old camping grounds. We made camp in an old log house, as all of our trips were to start from here as the base of supplies; it being the most convenient point from which to visit the other good collecting ground.



A Scene on Little Cedar Bayou, Laporte, Texas. From Photo loaned by N. L. Davis, Brockport, N. Y.

That day I found the nest of Ferruginous Rough-leg Hawk with three fresh eggs. Shot both male and female having a lively time getting the eggs.

My wife did not dare shoot for they kept too close to my head. The female had another very handsome egg which she would have laid the next day, but a stray shot crushed it all to pieces. The skins were in good shape and the eggs were fine.

The next day being Sunday we did

not go out but fixed up little things about camp, wrote to friends and entertained some callers. It was very amusing to watch the people when they first saw my wife. She was dressed in a full suit of "Duck," short skirt and leggings a regulation hunting coat and carried a little shot gun which she can use much better than a great many "would be hunters" who visit this county every fall.

The next day was so windy we did not leave the shelter of the woods but

THE MUSEUM.

found the nest of an American Golden-eye Duck with six eggs, didn't disturb them as the set was not complete. Found several completed nests of Red-shouldered Hawk but it was too early for eggs.

Each day until June 16th was nearly the same round of collecting interspersed with little trips of one two or more days to Devils Lake, Cuthead Sioux Indian Reservation, after Mound Builders relics, trips to other smaller lakes and large marshes, each trip an outing in itself.

That day June 16th I hurt my right arm badly compelling me to stop work of any kind thereby losing all the best collecting.

This accident was the cause of my settling on the shore of Stump Lake where my wife and I would be more than glad to meet the Editor of the MUSEUM or any of his friends, who might chance to visit this part of the country.

ALFRED H. EASTGATE.

Middleville, N. Y., Dec. 29, 1894.
Mr. Walter F. Webb.

Dear Sir:—The Dec. number of THE MUSEUM is received. It is an interesting journal for Naturalists to read, and I have every reason to believe that it will be a valuable advertising medium. I congratulate you on the success of your venture.

Yours Respectfully,
A. B. CRIM.

The Iowa Ornithologist

An Illustrated Monthly Magazine
Devoted to Ornithology and Oology.

The January number, which is Vol. 1, No. 2, contains a full page illustration of the Woodcock, a smaller one of the Bobolink, and several others. This is the only magazine in the Mississippi Valley, which is devoted to the study of birds.

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DAVID L. SAVAGE, Editor,
SALEM, IOWA.

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CHAS. K. REED,
267 Main St., Worcester, Mass.

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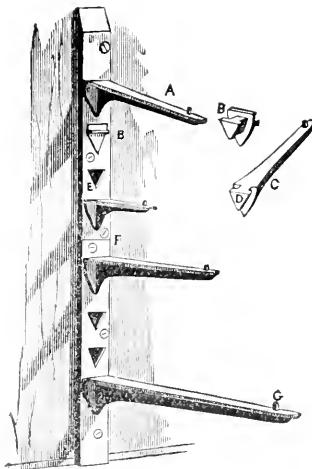


FIG. 1.

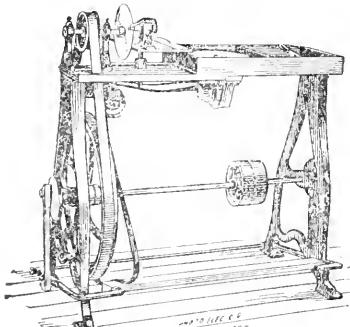


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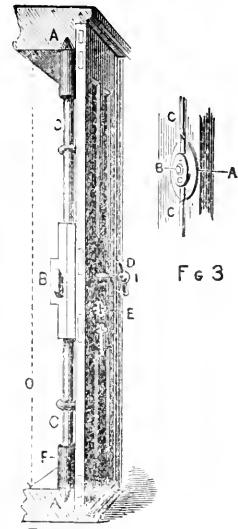


FIG. 2.

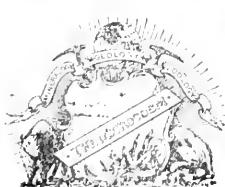
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NO. 5

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WANTED:—Birds eggs, rare and common, sets or singles, in any quantity for which we offer shells, minerals, fossils, curios, other eggs and in exceptional cases books, instruments or supplies. Send full list and what you want to get. W. F. WEBB, Albion, N. Y.

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NOTICE.—Any parties wishing to reach N. L. Davis, whose home address is Brockport, N. Y., but for some months past one of the chief assistants of the editor of the MUSEUM, should address him at Marysville, Unita Co., Wyoming, where he has gone to collect the "Varments of the Rockies."

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WANTED.—A first-class fossil of a fish. Will give in exchange nine different fossils or seven different Fractional Currency pieces. PERRY MARKS, Corn Exchange Bank, New York City.

I HAVE the following skins to exchange: 431, 433, 743a, 530, 517a, 581a, 557, 727a, 407, 413, 481, 120e. Skins of other localities wanted. PHIL K. GILMAN, 170 9th St., Oakland, Cal.

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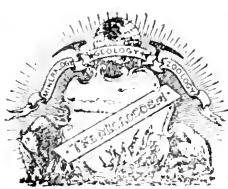
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THE MUSEUM.

A Monthly Magazine Devoted to Research in Natural Science.

VOL. I.

ALBION, N. Y., MARCH 15, 1895.

No. 5

Among the Rockies.

M. J. ELROD.

[Illinois Wesleyan University.]

The many enthusiastic readers of the MUSEUM who have not had the privilege of scampering among the mountains of the far west, can form but little idea of the vast scope of country unsettled, and in many places unexplored, of the wondrously romantic and beautiful scenery, with ciffs, crags, ravines, and plateaus, and above all, of the wide field for study and exploration in the various lines of natural history.

During the past summer the writer escorted a party of students on a tour for pleasure and profit. Altogether we were an even dozen. A week was spent at Pike's Peak, after which we went direct to Pocatello, Idaho, took teams from there and drove north along the Snake river, a distance of 200 miles, went into and around the National Park, a journey of 200 miles, and returned to Pocatello, making altogether 600 miles or more of travel by teams.

On a former occasion, in 1892, I spent two weeks camping and collecting at Seven Lakes, a few miles from the summit of Pike's Peak, at an altitude of 11,500 feet, and the following summer spent two weeks camped at Mt. Lou Lou, Montana, collecting and mountaineering. The Editor has kindly invited me to give the results of some of these collectings, and it is a

great pleasure to again live in my study the days I spent in the field, filled with hardships, though some of them were. In addition to collecting material, I this summer had a full photographic outfit with a Zeiss-anastigmat wide angled lens, 5x8, a diaphragm shutter, and two gross of plates, with nine double holders. I brought home some seventy-five good negatives, and some of these will be used in the illustrations which accompany these articles.

Manitou is one of the loveliest spots on the face of the earth. It is a small town, but larger than it appears, being scattered along the canons, ravines and gorges of that famous sentinel of the plains, Pike's Peak. Nestling among the foothills of the mountain, it bathes in an atmosphere of almost perpetual sunshine, the storm clouds on the peak occasionally lending a solemn grandeur to the scene, which, once seen, can never be forgotten. Down the streets rush the torrents in their mad haste to reach the level plains, with a surging and tumbling of waters delightfully pleasing to those used to the still-running brooks and muddy flats characteristic of the region of the "Father of Waters." Far up in the mountain some of these waters are turned into pipes for the town, giving a supply absolutely pure, and a pressure sufficient to almost blow out a fire. The climate is almost perfect, the scenery sublime, the attractions for artists, naturalists, or sight-seers



Entrance to the Garden of the Gods.

are far beyond expectations, but they are not to be had for nothing.

The attractions in this region are many. It would tire the patience of both the readers and publisher to recite them all. We may take first, however, the "Garden of the Gods," as it is perhaps the most famous.

The story is told that the origin of the name was after this wise: The renowned poet and philanthropist, Helen Hunt Jackson, whose home was in Colorado Springs, Colo., a short distance from which is the famous garden, was one day riding amongst the huge pillars of sandstone, admiring their beauty and wondrous variety of fantastic form, when she met an old negro, whom she accosted:

"Good morning! What is your name?"

"Jupiter."

"Have you a wife?"

"Yes'm."

"What is her name?"

"Juno, ma'am."

"Oh! So this is the Garden of the Gods, is it?"

And that name it has retained to this day.

The tired weary traveler who is obliged to trudge on foot through the garden is likely to view it in a different manner from the sentimentalist who drives leisurely from one pillar to another, a mile or more away. The hot sun strikes upon the red sand of the soil and is reflected with an intensity that must be felt to be understood. The sand and soil are ground and pulverized until the air along the road marks the trend of carriages by the cloud of dust. The hot sand, the stifling dust when there is a crowd sight seeing, the heated atmosphere, and lastly the filthy saloon in the corner of the grounds,—the only house where weary mortals may rest and procure a drink

of pure water by slipping around the back way, or a glass of *foul* liquor through the front way, and it impresses itself upon the weary traveler, exhausted with wandering in a rare atmosphere, and panting for a cup of cool mountain water, as more nearly the Garden of the Devils than of the Gods. We had a good deal of sympathy with a good old lady and her liege lord, both from a region where mountain brook and chasm and air were all unknown. They were piloted through by an imaginative individual and dropped down in town before they could catch a long breath. They called it the "Garden of the hack drivers."

The reader who is a collector will appreciate this bit of experience, our first day out. I started for a photographers to fill our plate holders, having forgotten this task. I gave over all my folding insect nets, bottles, and even my camera, to the party to collect with, while two of us went to perform the aforementioned part. We were to meet at the gateway, when the camera would be brought into use and a series of views taken. I was delayed and so got to the gateway after the appointed time, after a three-mile walk. It was deserted. We found a good place to rest, where the Peak was visible between the pillars of red sandstone, and feasted on the sight. It was a grand one. The summit is distant some twelve or fifteen miles, but it looks but two or three. Some light clouds rest above the mountain, and along one side is a small smoke column, marking the point reached by a train on the cog-road. Just beyond the gateway are seen the various rock forms of the Garden, the results of

centuries of erosion. How many winters the winds, and snows, and storms have beatan upon this sandstone we cannot estimate. The peculiar formations all have their names. A little rock and a good deal of imagination and you have a man, a coach and four, a bear, a sea lion, a frog, or a goat.

It is an inspiring sight. At our feet are the odd carvings of wind and rain for ages. The Peak beyond pierces the azure blue of heaven. Eastward the plain stretches away for hundreds of miles until it finally is parted by the great "Father of Waters." To the left is Cheyenne Mountain, one of the most entrancing places of God's creation. To the right is the hill that contains the beautiful and fantastic stalactites and stalagmites of the region. Far away to the north is seen peak after peak, as far as the eye can follow, until lost in the dim haze of distance.

One can readily imagine that here the Gods sported and played when ages ago the mountains and plains and gorges and ravines and cliffs were all in process of formation. Man was not yet upon the face of the earth. The face of the red man had not been mirrored in the placid surface of a mountain pool. His blood curdling yell had never been heard. The trout had not yet ascended the mountain streams, alpine flowers had not yet had an introduction into the sunny slopes. The buffalo, the elk, the prairie dog, the deer, the wolf, all were unknown, but in their stead strange beasts of huge size and unwieldly forms roamed at will, while in their rage the Gods tore and rent these huge columns and layers of sandstone, in their wrath, pushing them high toward heaven, ready to

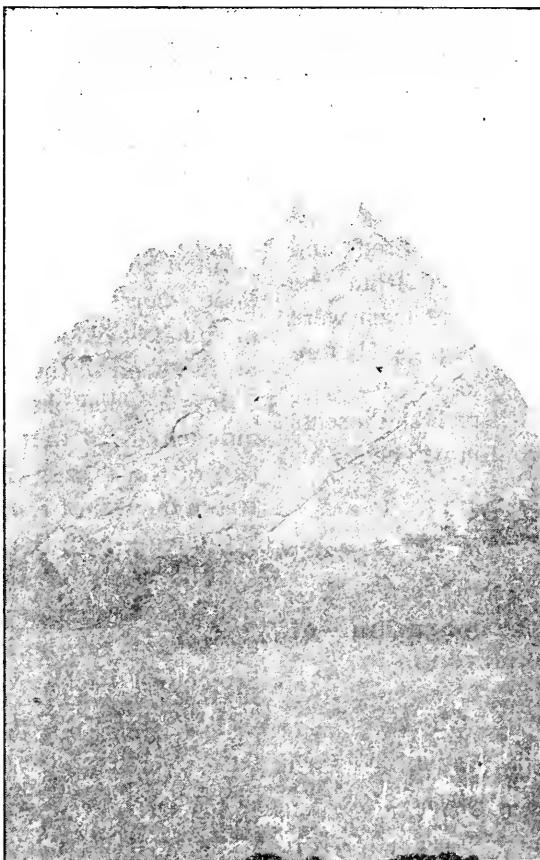
topple on some unfortunate passer by. Or possibly in play the force of Adam, as pointed out by the ubiquitous guide, was made and stuck on that pinnacle for envious eyes to behold. Balanced Rock, the greatest wonder of the region, a thunderbolt of Jupiter, probably struck vengeance upon some hated rival, and is ready yet, with a little picking at its base, to go thundering down the declivity, carrying death and destruction to everything that might be in its path. No more beautiful spot could be selected by the Gods for their habitation. Possibly they carved and moulded the thousands of fanciful, grotesque, multiform statutes of purest alabaster in the adjacent hills. The Cave of the Winds is witness of their deft fingers and vivid imagination, and each year discovers some new hallway where walked the Gods when weary with care or saddened with jealous bickerings. In the Grand Cavern is a beautiful hall where once they were wont to assemble and dance while some one of their number brought forth sweet music from the great organ on the wall, the stalactites of varying size yielding to the magic fingers of a goddess, and echoing such exquisite sweetness as can be made only by the deft fingering of a goddess nymph, and even responding to man with a melody bewildering in sweetness and volume. Up in the mountains, beyond Cheyenne, beyond Mt. Rosa, almost where now is the timber line, enclosed by Pike's Peak, old Baldy, and the smaller peaks between, was their bathing place, where their graceful bodies were dipped in the limpid waters of some one of the Seven Lakes, which are yet clear as crystal,

pure and fresh as the dews of heaven, mantled on every side by frowning peaks. And lastly, up yonder in South Cheyenne Canon they cut a pathway through a solid wall of granite, two thousand feet high,—the cliffs on either side now called the Pillars of Hercules,—constructed the beautiful Seven Falls, in whose spray they cooled their fevered brows as they climbed to the side of Cheyenne Mountain, where they sat and viewed the the plain, winding streams, and the huge unwieldy animals lumbering along, while they drank in the pure air, the sweet perfume of the trees and flowers all around.

Now these are beautiful thoughts. They certainly are more entrancing when viewing the scene than on paper.

We reveled in the scenery; but at the same time we got hungry, as it was far into the afternoon, and no companions in sight. We cannot collect, we cannot take pictures, we cannot eat, we can do but one thing, go to camp.

This is more than six miles away, and we have a big load to carry. We pass the cathedral, take one look at the bear and sea lion, and in no amiable mood head for the famous balanced rock. Lovely red winged grasshoppers are thick, the big yellow "crackers" tantalize us greatly, an occasional Satyrus is seen, then a gaunty ant lion. We rave, stamp, and groan in desperation. It is too much. We shed our burdens and use hats. But all mountain life is gonye, and luck is not with us. Late in the evening we reach camp, after climbing a few hundred feet. Supper is over, the fire out, the last straw has been added. Let the



"Sea Lion" and "Bear".

rest remain untold. How many of our readers have "been there?" There is one individual living that will never be caught in such a fix again. To think of going a thousand miles and then tie one's hands ones self.

But the next day was different. Two of us again started early, with heavier loads, but to me it seemed nothing. I had camera, plates, nets, gasoline, and some grub. The sun dust, roads, stones, and ditches seemed more natural. And material to add to the load was plentiful. This is the heart of the region of agricultural ants, whose hills are a conspicuous part of the scenery. The spoor of animals

contained numbers of beetles, and still others were found among the grass and under stones. At the Gateway, where yesterday we rested, a gay lizard, *Sceloporus undulatus*, Daudin, was found darting amongst the roots of a shrub, and after a hard battle was captured. But it soon dawned upon our minds that so many ants should mean ant lions. Nor were we mistaken. A little search proved them to be numerous, but wary and hard to see unless moving. One is obliged to watch where they light, and follow up and make a sweep, half the time at random.

But what big gauzy fellows. Our boxes were filled, our pockets bulged,

a basket was full of cacti, a huge toad was tied up in a handkerchief, a second basket was full of rocks, and we could hold or carry no more. The rest of the day, until darkness stopped work, was devoted to exposures, the results of some of which you see. Late at night we trudged to camp, tired and hungry, but how different from the night before. We two at least were happy enough to dance a gig before going to bed.

At a later date a list of the insects collected around Manitou will be given.

BLOOMINGTON, III.

Proceedings United States National Museum, 1885.

Notes On the Preparation of Rough Skeletons.

BY FREDERIC A. LUCAS.

(Continued from February No.)

CETACEANS: PORPOISES, BLACKFISH, ETC.

Porpoise skeletons are very easily prepared, but one or two points, such as the slender cheek-bones, and the pelvic bones or rudimentary hind limbs, require special care.

The pelvic bones are so small and so imbedded in the flesh that they are only too often thrown away.

It often happens that the last rib lies loose in the flesh, with its upper end several inches from the backbone. This should always be looked for.

There are no bones in the *sides* of the tail or flukes nor in the back fin, and they can be cut off close to the body and thrown away.

The hyoid is largely developed in most cetaceans, and will be found firmly attached to the base of the skull.

BIRDS.

In preparing a bird for a skeleton a little more care must be used than is necessary with a quadruped, the bones being lighter and more easily cut or broken.

The wings terminate in very small, pointed bones, and there is a similar bone—corresponding to the thumb of mammals—hidden in a tuft of feathers on the bend of the wing.

It is a good plan to leave this tuft untouched, as well as the outermost two or three wing feathers, so as to lessen the risk of removing any of these little bones with the skin.

Other parts requiring special attention are the slender points on the under side of the neck vertebrae, those projecting backward from the ribs, and the last bone of the tail.

It frequently occurs in birds that many of the tendons become ossified, as they do in the leg of a turkey. Look out for such on the under side of the neck, in the legs and wings, and along the sides of the back, and do not tear off the muscles as you would if preparing a skin.

Considerable flesh may be left on the neck and back and a *thin* coat of arsenical soap will serve to keep out the Dermestes which would otherwise attack these places.

The hyoid, or bones supporting the tongue and attached to the windpipe, should be saved, as should also the windpipe itself whenever, as in many ducks, it has bony structures developed in part of its length.

In many birds, and especially in birds of prey, there is a ring of bones surrounding the pupil of the eye. It is therefore best—unless you are an

expert—not to remove the eyeball, but to simply puncture it to allow the escape of its fluid contents.

Remove the brain carefully.

Wash and brush the skeleton if time allows, and in making a bundle for packing, bend the neck backward, and fold the legs and wings closely alongside of the body.

SPECIAL POINTS.

Cormorants have a small bone attached to the back of the skull, and in Auks and many similar birds there is a small bone at the elbow.

Sometimes there is a little bone at the hinder angle of the lower jaw, so that it is a good rule not to trim up a bird's skull too closely.

TURTLES.

In order to rough out a turtle the under shell or plastron must be removed.

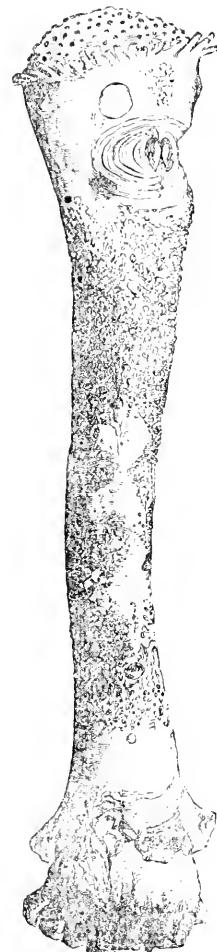
In sea turtles and a few others this can be cut loose by taking a little time to the operation, but in more solidly-built tortoises and most fresh-water turtles it is necessary to saw through the plastron.

The interior of the body being exposed, it is a comparatively easy matter to cut away the flesh.

Beware, however, of cutting into any bones, as they are frequently soft in texture and easily damaged. Usually this can be done without disjoining any of the legs, and it is better, especially in small specimens, to leave them attached to the body.

SNAKES.

Snakes require very little care in preparation after the skin has been removed, but in the larger serpents, such as boas and pythons, rudimen-



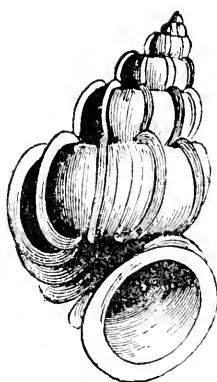
Aspergillum vaginiferum, Lam. Watering-pot shell, from Red Sea. A very curious shell, and the finest of the family.

tary hind legs are present and should be carefully preserved.

Externally the legs appear as two little claws situated on either side of the vent; internally they are slender bones, about an inch and a half in length, loosely attached to the ribs.

It is a comparatively easy matter to preserve both the skin and skeleton of any good-sized snake by exercising a little patience.

Do not try to skin through the mouth, but make a long cut on the



Scalaria pretiosa, Linn.—from China. Pure white, having many whorls; ornamented with Ribs.

under side and skin either way from it.

Coil up the skeleton and it will make a very compact bundle.

CROCODILES.

The breast-bone of crocodiles extends the entire length of the body, and although the hinder portion of it is not attached to the backbone, yet great care is necessary in disemboweling not to cut away any of the slender bones of which it is formed.

There are also cartilaginous projections on the ribs which should not be sliced off in roughing them out.

FISHES.

Fishes vary so much in their structure that it is a difficult matter to give any directions for preparing their skeletons that would be of much service. Almost invariably there are two rows of ribs present, and these extend backward for some distance.

Proceed slowly and carefully, as the edge of the scalpel will often give notice of some unsuspected bone.

Be especially careful about the head. There is a chain of bones encircling the eye, and the eyeball itself is often a bony cup.

Occasionally there are two or three-bones attached to the back part of the hinder portion of the head, and the patch of flesh on the cheek is about all that can be safely removed.

Wash thoroughly, and when the skeleton is hung up to dry place bits of wood or other material between the gills so that the air may circulate freely and dry them rapidly.

PACKING.

First be sure that a skeleton, and especially a small one is *thoroughly dry*. Otherwise it is apt to "sweat" and rot the ligaments.

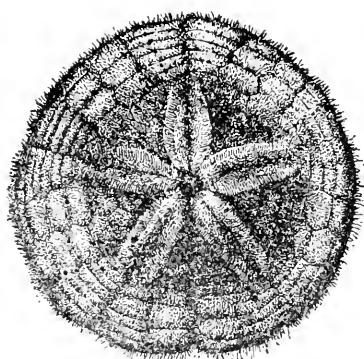
In case of a large skeleton this would do no harm, but as the bones of small animals are left attached to one another by their ligaments and are not wired together, any such separation causes serious injury.

If the specimen is the size of a deer, it will be necessary to disjoint the backbone just behind the ribs in order to make a compact bundle.

A moose or buffalo can be cut still more by separating the leg bones at each joint and making several sections of the backbone.

Occasionally it is necessary to reduce a skeleton to its smallest possible dimensions, and then, in addition to the above measures, the breastbone must be separated from the ribs by cutting through the cartilage *just below the end of each rib*. The ribs can then be detached from the backbone, and thus dismantled a good-sized skeleton can be packed in a flour barrel. Barrels, by the way, are very good for packing purposes.

Boxes should be tight, so as to shut out hungry dogs, and prevent entirely the attacks of rats and mice. I have



Echnarachnius parma, Lam. Sand Dollar.
The common species ranging from Maryland
to Labrador, common in Maine,
Massachusetts, etc.

frequently seen valuable skeletons ruined in a single night by the ravages of one or two rats.

Care should also be taken not to leave boxes open over night while being packed, lest mice should make a nest in the packing material and be shut up with the specimens.

Straw or hay is the best packing material, but Spanish moss, shavings, "excelsior," or cocoa fiber will do. Usually but little is needed, the main point being to prevent the skeletons or loose bones from rattling about to the inevitable damage of the weaker portions.

Beware of sea-weed. No matter how dry it appears to be, it contains so much salt as to become wet when exposed to a moist atmosphere.

Never put alum on a skeleton nor soak any bones in a bath containing alum.

In hot, moist climates it is occasionally allowable to sprinkle a little salt on the bones of a large animal in order to keep the flesh from putrefying instead of drying up.

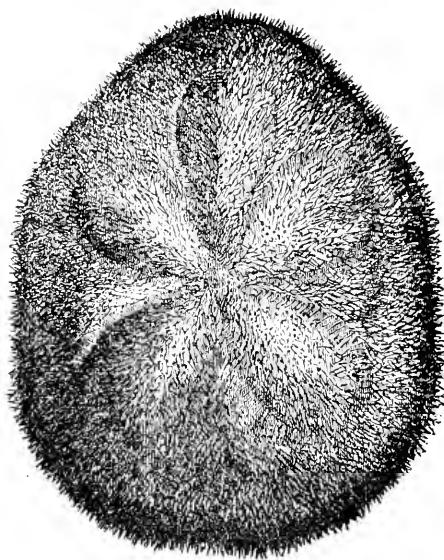
Small skeletons should on no account be salted, nor should large ones be boiled to remove the flesh.

An Ancient Lake.

To him who is intent upon making a Mineralogical collection which shall be conspicuous by the beauty of its specimens, regardless of scientific value, Vermont, though by no means barren, possesses no extraordinary interest. But to him who is intent upon investigating the mysteries of surface geology, especially if he chance to be studying the phenomenon known as the vertical motion of the earth, no locality, east of the Rocky Mountains, will have a greater interest. Nowhere in the United States can the results of this phenomenon be more clearly traced, than among the Green Mountains.

After the erection of the Green Mountains, and the formation of that part of the country now known as New England, but before the Drift Period, the whole country slowly settled beneath the surface of the ocean until only the highest peaks of the White Mountains were visible. The highest peaks of the Green Mountains, some of which now have an elevation of more than four thousand feet, and which, before the depression began, had an elevation, at least as high, and possibly much higher, were covered by more than a thousand feet of water. Striae and wave-lines on the White Mountains show the height to which the water reached, and a comparison of altitudes shows the depth of the water over other localities.

During this period of submersion, oceanic life flourished in the heart of New England. Hundreds of varieties



Diplotheonanthus rosaceus, Gray. "Sea Biscuit," Bahamas. A curious species, after Style of the large "Sea Beavers."

of marine shells have been found. In some localities certain kinds are found in immense numbers. In a few places fossil sponges have been discovered, and once, in Charlotte, the skeleton of an extinct species of whale was found some eight or ten feet below the surface of the earth. Another was found near Montreal; this one was carried to London, while the former is now in the museum of the State House at Montpelier.

At length the same forces, which caused the submergence of the continent, began to act in an opposite direction, and, as a result, the continent began to rise, and after the lapse of an indeterminable space of time, it attained its present elevation. The changes which took place during this period of alternate depression and elevation, most of which resulted from fractures caused by unequal pressure of the up-

lifting force, form one of the most interesting, as well as intricate features of surface geology.

Before the submergence, the various mountain ranges which form the Green Mountain system, stretched in unbroken masses throughout their whole extent. The Winooski, the Sawoille and the Missisco rivers, which now rise east of the principal ranges and flow westerly through great chasms in the mountains, which have been cleft in their very base, had in those days no existence. The same is true of the St. Francis river, which now drains Lake Memphremagog into the St. Lawrence river. A large lake occupied the central portion of what is now Washington county; another lake, very deep but of smaller dimensions, covered what is now the town of Hardwick. All this and much more is learned by a study of the terraces which formed the banks of the ancient lakes and rivers, and corroborated by an examination of wave-lines upon the mountain sides.

Now, Lake Memphremagog has an elevation of six-hundred and eighty-five feet above the ocean level. It has an area of seventy-five square miles, and by means of St. Francis river, it is drained northerly into the St. Lawrence river. Then, a mountain spur, jutting off from the easterly range of the Green Mountain system, extended westerly, across the valley of the St. Francis river in Canada, and formed a barrier which raised the waters of the lake to a height of five hundred and eighty feet above its present level, and caused it to expand over an area of more than three thousand square miles.

Black river is a small, sluggish, uninteresting stream, flowing north and

emptying into Lake Memphremagog. Then, it flowed south, a mighty stream, more than a mile wide, and more than three hundred feet deep. So far as is known, it was the largest, though not the longest river in that old world. It occupied the same valley that Black river now occupies, and, extending south to the old lake at Harkwick, connected the two lakes and formed the outlet of Lake Memphremagog. Emerging, in two large streams, from the southern extremity of the Hardwick lake, it continued its southerly course, until it became lost in the larger lake in the central part of Washington county. One of these connecting streams bore a little to the east, and followed the valley now occupied by Kingsbury branch, through the towns of Woodbury and Calais. The other, bearing a little to the west, passed through the towns of Elmore and a part of Worcester, following the course of what is now known as the Eagle Ledge valley in which a small stream now flows.

Emerging from this lake, the stream continued its southerly course, through the towns of Williamsport, Brookfield, and Randolph, when it entered the valley now occupied by the White river, in which it continued until it joined the Connecticut river.

During the period of submergence, it seems that the force was exerted so evenly upon all parts of the continent, that it sank without a fracture. The same may be said to be true during the period of emergence until the continent had reached a height nearly equal to its present elevation. Then, for some cause, the force slightly decreased in the northern parts of the state. The

cohesion of the rocks which formed the mountains was not sufficient to withstand the unequal pressure. They broke in four separate places, and deep, transverse chasms were formed, which extended to the level of the surrounding country.

Beginning at the south, the first fracture, (first in geographical order, for they were simultaneous in point of time,) formed the valley in which the Winooski river now flows, and chained the most southerly lake. The second, formed the valley of the Samoille river, and chained the Hardwick lake. The third formed the Missisco valley, but had no effect upon the lake. The fourth fracture broke down the barrier across the St. Francis river, and chained Lake Memphremagog nearly to its present level. Four times since, have the mountains broken, slightly deepening the chasms, and the river beds, and each time forming a terrace which plainly tells the story.

In the central part of Washington county, may also be seen indications of a much smaller lake which existed at a later period, and at a much lower level. Indications of this lake are much more plain than those of the ancient lake, and without some mention might confuse or mislead the observer. This lake, however was entirely distinct, and was caused by an ice-gorge forming in one of the chasms in the mountains through which the Winooski river finds its way. Doubtless it continued in existence for many centuries and was finally drained by the melting of the icy barrier which formed it. In a future paper this lake will be more fully described.

C. O. Ormsbee,
Montpelier, Vt.

THE MUSEUM.

A Monthly Magazine devoted to Ornithology, Oology, Mollusca, Echinodermata, Mineralogy and Allied Sciences.

**Walter F. Webb, Editor and Pub'r,
Albion, N. Y.**

Correspondence and items of interest on above topics, as well as notes on the various Museums of the World—views from same, discoveries relative to the handling and keeping of Natural History material, descriptive habits of various species, are solicited from all.

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**WALTER F. WEBB,
ALBION, ORLEANS CO., N. Y.**

NOTES.

Look out for the Great-horned Owls this month. Now is the time to "corral" their eggs.

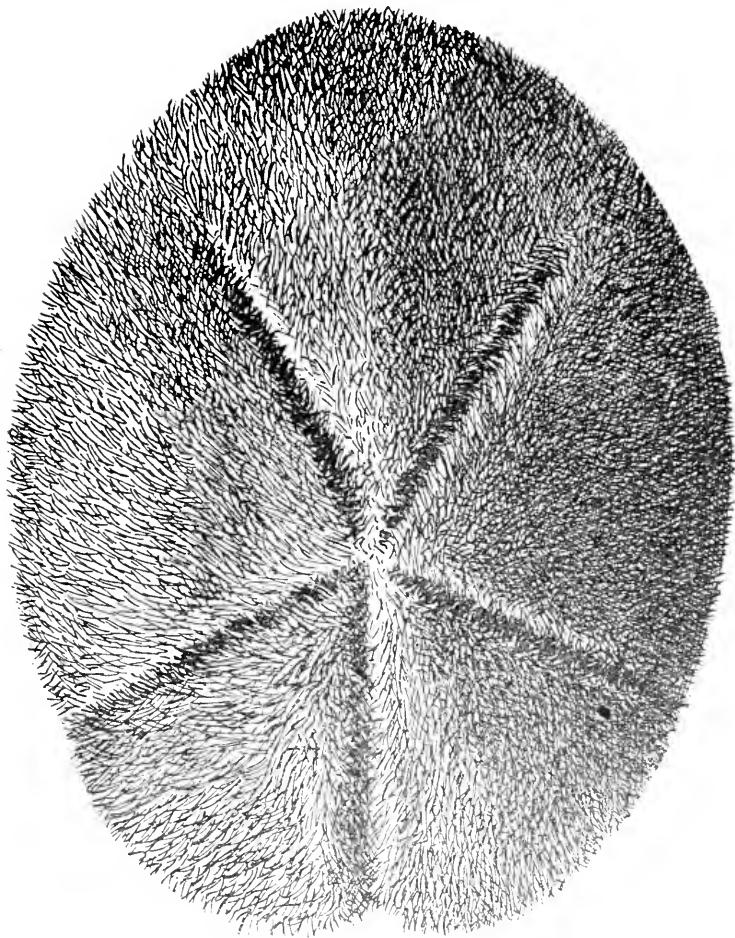
Reports are coming in from various parts of the country, of Evening Grosbeaks being taken in quantity during the past winter.

Some new arrivals in bird skins, the past month, are Long-crested, Wood-hens, and Phoe Jays, American Magpie, Dusky Grouse, Sage Hen, etc.

If some of our readers are of an artistic turn of mind, we would invite them to submit to the editor a design of a cover for THE MUSEUM. By this time you will have seen something of its scope, which should be to some extent delineated in the design. Use

white paper, and pen or India ink—latter preferable. To all who compete, we will send, gratis, a fine leather bound copy of the *O. and O. Manual*; and if any should be found available we will give a due bill good for \$5.00 worth of anything we advertise. We trust this will be sufficient incentive for many to put forth their best efforts.

We wish to call the attention of every reader, to our new Ornithologists' and Oologists' Manual. This is now all finished and ready to mail. It has been made convenient to carry in the pocket and handy for quick reference. The prices are standard in every detail, and will be found to be up to date in every way—combining, as it does, the prices of Eggs, Bird and Mammal Skins, approximate number of eggs laid by every family of N. A. Birds, how to skin and prepare all Bird and Mammal skins, how to prepare Eggs and Nests, prices of Heads, mounting all kinds of birds and Mammals, large and complete lists of Tools, Books, etc., making a volume of 100 pages, at the nominal price of 25 cents, or 50 cents bound in red flexible leather, round corners, etc., it makes a work no collector or connoisseur to be without. Various schemes have been started in the past for a book of this character, the originators usually soliciting the price of distribution and after getting such price fix or not, as they see fit. We have not adopted this method, but at a fair expense have got in the material cost, and I published it, not soliciting or advertising it for sale until ready to mail, then now offer a manual to our subscribers, or anyone that desires it, at a sum less than the cost the same day it is received. Glad to hear from you all.



Brissus ventricosus, Lth. Black Sea Beaver. Covered with small short spines, but more frequently the spines are removed before offered for sale.

The Rodents of Michigan.

—
BY MORRIS GIBBS.
—

The following catalogue is the result of observations extending over a great many years. The notes are mainly my own, but the assistance of observing friends has been received.

The gnawing mammals comprise the largest group in the division; and while a few of the species are selected for food, and no doubt, several others

would prove worthy of our attention, the majority are to be considered as pests. It is to be doubted, if, aside from their worth as food products, we are benefited by their existence, while we know, that to the agriculturist and horticulturist they are a perpetual nuisance.

This list, though referring to Michigan species, may be of interest to all, as it practically embraces the mammals of the Great Lake Region.

NORTHERN HARE.

Lepus americanus, Erxl.

Not common and never has been to my knowledge. I have never taken it. Occasionally shot in the extreme western part of this state and ranging north. Called white jack by some hunters.

GRAY RABBIT; COTTON TAIL.

Lepus sylvaticus, Bach,

Very abundant until about ten years ago. About twelve years ago the introduction of the ferret, used them up and within a few years they became very scarce. A very interesting species. The young are raised in little forms, in grass and leaves, and above ground, as far as my observations go. However, in cold weather, burrows of woodchucks, skunk, and brush piles are frequented by them. The common wild rabbit is excellent eating.

CANADA PORCUPINE.

Erethizon dorsatus, L.

Often, and improperly called hedgehog. The porcupine is a well distributed mammal in Michigan being found from our southern tier of counties, to our extreme northern limits; but is now scarce south of the 43rd parallel, and is abundant north of the 45th degree.

This animal is a great climber, and is often found in the tops of tall trees, where it feeds on the foliage. In truth it spends much of its time well up from the ground. It produces two young to my knowledge, and these little fellows will defend themselves with their spines much after the manner of the old ones. I have met with young less than fourth size who were provided with spines.

The flesh of the porcupine is rank and greasy, and attempts to cook and eat it are always failures, excepting with hungry Indians.

JUMPING MOUSE.

Zapus hudsonius, L.

Irregularly distributed and not generally known. Occasionally met with, and generally in low sections, and usually in forests or the edges of swamps. This little mouse may be easily identified by its remarkably long tail and hind legs. Notwithstanding its power to escape by jumping it is not rarely caught with the hands when scared from the nest.

MUSKRAT.

Fiber zibethicus, L.

This interesting mammal, called musquash by the Indians, and water rat is well distributed throughout the country. Nests here largely in burrows along the banks of running water and also in the banks of small ponds and marshes and lakes. Many of the typical nests are to be seen on the large lakes around the edge, and in shallow lily pad ponds. I have observed their habits, more of late years, along little brooks while fishing for trout. The muskrats often showed themselves, and played in plain sight before observing me. I wish that I might occupy space for an extended article on their interesting habits. Am satisfied that more rats, ten times over, occupy habitations along the banks of rivers, and smaller streams, than build houses in marshes and ponds.

The musquash has many enemies besides man, and his depredations are, or rather, have been very extensive until

lately. The reduction in prices has caused a great cessation in the amount of trapping. The mink is an enemy of the muskrat, as I once observed in a sanguinary battle in which the mink was victorious through its activity and sharp teeth. Snakes devour the young especially the large water snake, *Natrix sipedon*, L.

I have taken young muskrats from the nest. They are born with their eyes shut, and are able to swim in July, or a little earlier. They do not grow rapidly.

LEMMING MOUSE.

Synaptomys cooperi, Baird.

A rare species in Michigan, but few specimens have been secured.

SHORT-TAILED MEADOW MOUSE.

Arvicola austerus.

Some claim this species is common in Michigan. Others claim it is rare. The truth is there are very few observers qualified to distinguish between our species.

MEADOW MOUSE.

Arvicola pennsylvanicus, Ord.

Abundant. Usually found about swamps, marshes and low meadows. Never observed on high or sandy soil, that I am aware of. A peculiar, interesting species, seen bobbing in and out of holes, bushes and bunches of weeds; with such rapidity that it makes one feel uncertain, occasionally, whether it is a snake, lizard, mouse or shadow. Lives in small burrows usually in the ground, but often in dead stumps or hollows and sometimes under logs. In early spring when the snow still partially covers the ground or has just disappeared, small nests made of grass are occupied by these

little fellows. This is a good season to secure specimens. The nest should first be struck smartly with a light board or shingle, and then one may tear open the nest when their chances are about one to four that a stupefied mouse is found. I have never taken more than one in a nest. It seems odd, yet pleasant to contemplate, that although the outside of the nest may be covered with snow, or worse, mud and slush, yet within, the occupier reclines in a warm, dry cavity, filled with carefully arranged grass blades, and perhaps a few broken leaves.

BLACK RAT.

Mus rattus, L.

A cosmopolitan species introduced from the old world. Very rare here now, or more probably extinct, as it is killed off by the next species.

BROWN RAT; NORWAY RAT.

Mus decumanus, Pallas.

Abundant, cosmopolitan, and like next, too well known to require notes.

COMMON HOUSE MOUSE.

Mus musculus, L.

An ubiquitous pest.

DEER MOUSE.

Calomys americanus, Kerr.

Also called White-footed Mouse. Often observed, from harvest, on through the autumn months. October last finishes its appearance with us generally. It builds beautiful little nests, both on the ground and in the bushes, from three to ten feet or more from the ground. One often sees the little grassy nests in the bushes in winter but I have never been able to shake mousie out at that season. He must burrow in winter. Still they do not

always hibernate for an individual is occasionally seen about the barns, sheds and stacks in January and February.

A peculiarity of this species, apparently not observed in any other species of mouse, is the great care it takes for its young, and their corresponding attachment for the mother. It has been repeatedly seen, that frequently, when the female is ousted from her nest, or disturbed, that she will run, making quite long jumps, with from two to four young ones hanging to her teats, and with such tenacity, that they never once loosened their hold. I have had the pleasure of seeing this remarkable performance once, but have several records from my trusty, observing friends.

PRAIRIE MOUSE.

Calomys michiganensis, Aud. and Bach

A rare species in most sections, and not generally known to collectors in our state, and surely confounded with the last species by some observers.

HARVEST MOUSE.

Reithrodon humilis.

Embraced in the observations of but one authority. Certainly rare.

BEAVER.

Caster fiber, L.

From recent correspondence I have learned that this valuable fur-bearing mammal still thrives in the Upper Peninsula, and is said to be increasing in certain sections; which if true, is due to the fact that they are not trapped as persistently as formerly, from the smaller prices which the pelts bring. Still it is only a question of time when the beaver will be ranked as an extinct species in Michigan.

One friend writes me that he buys some skins each year. They are still found in small colonies in Lower Michigan north of the 45th parallel.

GROUND HOG; WOODCHUCK.

Arctomys monax, L.

Too abundant by half to suit the farmers. A rapid burrower. Generally has three entrances to its subterranean abode, often only two passages and occasionally four. Feeds largely on clover during summer, and its burrows may oftener be found near clover fields, or in them, than anywhere else on the farms. Changes its habitation often, as a rule. I think as often as once a year. Frequently wanders to quite a distance, when, if seen, may be easily dispatched, as though crafty, the ground hog is not a runner. So anxious is he for his safety when away from the entrance to his hole, that he frequently commits himself, by making one aware of his presence. Instead of keeping quiet or sneaking in an opposite direction, he is often fool enough to start on a straight line for some hole, often thereby passing much nearer to an enemy. If attacked he will show considerable fight, and fairly hisses in his fierceness. I overtook one one day, when he mounted a stump, and apparently defied me. On drawing near, he made quite a spring for so lazy an animal, and came near nipping me. They can use their large incisor teeth with great effect, and the dog which attacks a woodchuck, must have care unless he understands fighting them.

The woodchuck occasionally climbs a tree, and may go as high as thirty feet from the ground. I have observed one all of twenty feet up. They

usually occupy the first limb of the tree and appear to enjoy the strange position. While in this position I think they go to sleep, at least some times, from the fact that I once approached one from a distance across an open field, that made no attempt to escape, although his hole was easily accessible. The first time I ever saw one in a tree I did not know what to make of it. I could only see its fur and an eye, as it was rolled into a ball. It looked to me more like a monkey than anything else. I have never seen one climb a tree but I have observed one descend, and nothing can exceed the grotesque movements of the animal. A third of the time it is moving sideways, then again tail first like a bear, and occasionally nearly head first; never fully so though, then as it neared the ground it rolled itself into a heap and tumbled down.

The nest or burrows are often found in deep woods, but never in any low ground. The animal appears to despise water and I have seen burrows where there was no chance to get water short of a mile unless going to the farmer's well. Some one has attempted to show that the prairie dog digs wells for itself, if so, then why not the woodchuck; but I can assure you that there are many woodchucks in Oph temo township of this state and that there is no running, or lake water to be had within a mile, and as to digging wells for themselves, why the farmers have to dig ninety feet.

My theory about the prairie dog securing drink is similar to the ground hog's habit. The opinion is this: The ground hog feeds largely at night, as does the marmot, and as dews often

fall heavily the animals are supplied, as sheep often obtain their drink for weeks at a stretch.

The ground hog is considered a harbinger of spring, either for good or bad, and an early spring depends on his seeing his shadow or not. If he sees his shadow on February second then the sun shone, and he returns to his burrow and will not reappear for two months. I do not think the woodchuck appears outside of his burrow one season out of ten before February twentieth, and then the season must be very early. When he issues at an early date it is for the purpose of seeking his mate, and not to cause speculation upon the weather among the ignorant.

STRIPPED PRAIRIE SQUIRREL; GOPHER. *Spermophilus tridecemlineatus*, Mitch.

A common burrowing rodent. More often found on sandy and sandy clay soil. Not as often on low lands. I cannot see that the name prairie is particularly applicable as I have found it more numerous when white oak woods have been cleared rather than on prairies. Lives entirely in burrows. It is a pestiferous little creature to the farmer. I have no doubt it necessarily feeds on roots and grasses, and from necessity destroys corn, wheat and oat roots. Has a peculiar cry, quite odd, by which it may be detected at some distance.

The young are nearly full grown at harvest time, and nests full of both old and young may be drowned out to the amusement of small boys and dogs.

GRAY SPERMOPHILE.

Spermophilus franklinii, Sabine.

One specimen taken in our state, in

Oakland County, by Mr. J. W. Anderson. It is a rare species, but as it is also found in Indiana it is probable that its range will be extended.

CHIPMUNK; GROUND SQUIRREL.

Tarnias striatus, L.

An abundant woodland species, building its nest in the ground, old dead logs and stumps, and sometimes as much as fifty feet from the ground in a suitable hollow. Occasionally forms nests of leaves and grass in bushes, sometimes as much as fifteen feet from the ground. This little fellow, the smallest of our squirrels, hibernates thoroughly, although always supplying himself with a good seasons stock of provisions. From under a log occupied by a chipmunk, I once took a half bushel of butternuts, and it is a common occurrence also to find walnuts, hickory nuts as well as great quantities of acorns. It would seem from this, that the little fellows evidently supply this larder with a view of occasionally waking up from their long winter nap and taking some refreshments.

The pleasing little chatters are rarely seen from the last sunny days of November until March. One finds tiny tracks in the woods when the snow becomes a little soft in late February or early March indicating that the sleepers have waked up for a little recreation or perhaps with a view to foraging as the provision in store may be running low. We do not hear the cheerful, chirping notes, however, until the snow is about gone, and it is during the reign of the violets and buttercups that the chipmunks seem happiest.

RED SQUIRREL; CHICKAREE.

Sciurus hudsonius, Erxl.

A well distributed species, found in all kinds of wooded lands and around villages and farms. More fond of heavy timber and low land than of oak openings. Our most common species.

This squirrel is encouraged to stay among us, and from the fact that it is rarely shot, being too small for the table, has become quite familiar. It often builds its nest, and for aught I know rears young in garrets, cellars, barns and sheds. A pleasing and active fellow. I have seen a red squirrel chase the black one which fled in terror, and dared not again mount the tree occupied by the valient little chickaree. The squirrel hibernates like the others. It builds nests of leaves within hollows generally but sometimes exposed to wind and weather.

NORTHERN GREY SQUIRREL.

Sciurus carolinensis leucotis, Copper.

Black or Gray Squirrel. In Kalamazoo County, as well as throughout the state, we have no gray squirrels to speak of. The black variety is found however in numbers some seasons. I have never seen more than ten grays taken in a season in my locality. A more gregarious species, if I may use the term, than the last. It is also given to migration at times. We have had no great squirrel seasons in about fourteen years. This squirrel does not always build its nest in hollows. Occasionally forms a nest of leaves among the branches in the tall trees. Have shot individuals from their nests, and secured them as they fell wounded to the ground.

FOX SQUIRREL.

Sciurus niger ludovicianus, Allen.

Formerly a very abundant species but since the time when every boy over 12 years old, has a gun, they have become scarce, as has all the other game, furred or feathered.

This squirrel does not imigrate, as do the black and gray squirrels, I think. But they have been gradually killed off, until very few remain, and it is difficult to secure a brace in a day's hunt, the chances being even against that score in my locality. Rarely occupy nests; more often hollows in trees. It is not an easy matter to overtake, and get a shot at one of these big fellows. I have observed one more than once leaping from one tree to another in heavy timbered lands, or among oak woods filled in by second growth. To load your gun, run among the trees, dodging about, with the necessity of keeping one's eyes constantly on the squirrel is a very difficult matter. One shoots too soon and the squirrel goes on, and while one is reloading the old sly fellow has gained a good lead again, and the first you know disappears in a hollow limb, when the hunt is up for that day.

The fox squirrel is very tough and should not be fired at unless one is within four or five rods. To shoot at six rods or over is nonesense for even if the squirrel is badly peppered the shot only go just beneath the skin, and if his lungs are almost torn to pieces, he will often reach his hole. I have seen one fall sixty feet, get up and climb a tree to escape. The rifle is the best means of success, if one can catch foxy napping, when a well

directed bullet finishes the business.

A peculiar specimen now in my collection, stuffed in 1873, is oddly marked. It is a perfect fox squirrel in form, but gives evidence of being a hybrid. It is a fox squirrel in color above, and sides, as well as tail, top of head and outsides of legs. Its under parts, however, are black, as well as the chin, throat, belly, breast, and inside of legs. It is a peculiarly marked fox squirrel or else a hybrid with the black.

FLYING SQUIRREL.

Sciuropterus volans, L.

A very interesting species. A resident, but rarely seen before late March or after late October. A hibernating species like the other squirrels. I have met with them several times and have found the young once when very small and still with their eyes closed. The young were so covered with pulverized dry bark, moss and fur pickings that they were hardly detected in the cavity. Nearly always found on elevated land, but quite often in low and timbered land. The nests are almost invariably placed near water, either a lake or small stream. Three or four young appears to be a litter. Once found a nest containing three old ones, a common occurrence at some seasons of the year, but never in the spring. This was in December.

The young are born in the spring, usually late April, through May, and sometimes in June. The small ones, looking, without hair, like the peculiar extinct *pterodactyle*, with its fleshy membrane reaching from fore to hind legs. A very interesting species, and often tamed when it becomes a pleasing pet, but usually escapes.

NORTHERN FLYING SQUIRREL.

Sciuropterus volans sabrinus.

One specimen secured in the Upper Peninsula by Oscar B. Warren, Marquette Co., 1894.

**Further Notes on Antrostomus
Vociferous Whip-poor-will.**

J. H. BOWLES.

Though ably treated by a Michigan correspondent in the November number of the "MUSEUM" it is possible that the habits of this bird in its most eastern haunts may afford some interest to the uninitiated. That the habits of the eastern bird differ greatly from those of the western I hope to show by giving my own and my brother's experience.

The Whip-poor-will arrives in eastern Massachusetts usually about the first of May, but on April 25, 1893, I was surprised to hear one in its favorite haunt. I have further reason to remember this date, as at the time I was up an oak tree peering into a hole in which a Screech Owl (*Megascops asio*) had set up house keeping.

Now as to the locality where the nest, or set of eggs, is to be found: In Michigan it is "in a forest," while in Massachusetts I have never seen the eggs in large woods, though I confess to having met with only five sets. All of these were on high ground in young oak and chestnut woods, one being in a patch of "scrub" chestnuts of from six to ten feet in height. All were on the edge of clearings, and all but one within a few yards of much travelled wood and main roads.

The spot on which the eggs are laid seems to be essentially the same as that of the western bird, though, in

a nest of which I have before me, the eggs were placed on a tuft of dead grass still rooted in the ground. I also am of the opinion that the leaves and ground are never disturbed in order to form any semblance of a nest.

The set is here usually completed in the third week of May, though occasionally fresh eggs are found in early June. If robbed of its first laying, which I have always found to consist of two eggs, a third egg is sometimes laid in the immediate vicinity (of this second set, more anon.) I can add nothing to the excellent description given on the color and shape of the eggs, except that one egg is sometime larger than the other, but give the extremes of a series of eggs in my collection. 1.23 x .85, 1.15 x .78 inches.

All of my sets were found by my dog flushing the bird, and, when necessary, leading me to the eggs. This is a very certain method of hunting nests, though some time and patience is needed in training the dog who must also be taught to think an egg a combination of white lead, strychnine and cayenne pepper.

The actions of the birds when flushed from their eggs, are variable, sometimes they fly silently out of sight, while at others they will be crippled to a distressing extent. Away from the nest, however, we easterners consider the Whip-poor-will among our most sociable bird acquaintances. In the summer a pair of them, having each year a nest not two hundred yards from my place, came into my avenue every evening and hopped about on the ash walk (not forty feet from the house and the barn) where they seemed to find an abundance of food.

I think they also eat the bits of coal in order to aid digestion. My family and I have frequently stood within twenty feet of them, while they fed as unconcernedly as if no one were near. When through feeding they fly back to their nest, but in a short time the male returns and lighting in a heavy woodbine that hangs on the front of the house, fully repays me for the coal he and his spouse have taken, by singing his best for half an hour. By ten o'clock he takes his leave, to return at exactly four o'clock the next morning. Then he gives another half hour's solo which is not always so welcome as the evening one. A sound like "chuck" is always thrown in between every "Whip-poor-will," but it cannot be heard at a greater distance than a few yards.

I should have sent this article sooner, but, disliking to give a time-worn fact (as I feared it might be) to science, have waited until now before giving an answer to the question, "How do Goat-suckers carry their young and eggs?" Several years ago I flushed a Whip-poor-will that rose with a baby bird clutched firmly *between her thighs*. Careful examination of the ground disclosed three-quarters of an egg shell which, being moist, showed that it had been recently hatched. This does not necessarily disprove the gape theory, as she may have had another young one or egg in her mouth to preserve the equilibrium, but I doubt it as this was a second set. Returning a week later I again flushed the old bird from her young one at a short distance from the first place. He was then well grown, so thinking that affairs might take an interesting turn, I sat down

and watched at a short distance. The mother bird did all in her power to induce the little one to move away. She went up to it and then withdrew a few inches, then shoved it away from me with her breast, in exactly the same way I have seen the English Sparrow do. But it was useless, for the youngster, having arrived at the well-known age of knowing more than his parents, thought I was perfectly harmless and so would not budge. For once he was right.

How to Interest People in The Microscope.

It may be that some of our readers have been discouraged in attempts to interest their friends in what is wonderfully beautiful to themselves, and I presume not a few have felt a wave of disgust pass through their souls as the friend, earnestly trying to seem appreciative, and feeling a necessity to liken the vision to some known object, has remarked its close similarity to a meeting-house, a bit of lace, a strainer, a pine tree, or a dog's tail. It is a fact to be borne in mind, amid these and kindred trials, that the eye must be trained before it sees correctly, and this is particularly true in the present case. The skillful microscopist is in danger of forgetting his own difficulties with his eyelashes the first time he looked through the tube upon the brilliant background and saw something glistening in the light. We do not ordinarily hold what we are looking at against the light, and this is one reason why a new observer is so dazed when he looks into the microscope. With all due regard to the good judgment

and common sense of one who fails to interest his friends in the microscope, let me say the failure is generally due to either a wrong choice of objects, or of the time selected to display them.

Of course a novice with five minutes to catch a train, will not give much intelligent notice to a slide showing division of nucleus in the hair of *Tradescantia*, but he might take one glance at a flower seed, and remember while on the train how prettily Nature has wrapped up the embryo poppy.

Then there is another thought concerning the introduction or preface to the display. We all know that one who has heard of anything highly praised in advance, rarely deems it worthy of so great praise when he sees it. It makes little difference whether it be a landscape, a work of art, or a microscopical slide. The one exploring should have the right of making his own discoveries of beauty, and rejoicing in them in his own way, however unconventional. If he likens the object to some incongruous thing—his case is not hopeless. Every one of us may be placed in a position where we cannot speak the proper language used by those at home in it. Therefore explain all that is needed, and then wait, and cordially welcome the expression of wonder or pleasure, and your reward shall be that you have won the interest of your friend.

There must be judgement exercised in the selection of objects. This will involve considerations of the age, information, and tastes of the one you wish to please, as well as the length of time advisable to be taken. Often a single object well shown is better than more—because it leaves a perfectly

clear picture in the mind that is instructive to recall. Keep closely to the simple things that are easily understood and have no complicated structure.

There should be nothing to shock or disturb the observer, so you must be considerate of his natural prejudices, and however much you may enjoy the dissection of worms or the comparison of cheese mites with sugar mites, or abnormal tissue with normal—be sure the average spectator will shrink from the sight and feel uneasy over the next meal. (I would like to say all I think of the evil done by blundering people in this line.)

Confine yourself to low powers until your friend has mastered the matters of focus and moving the object on the stage—and then use high powers sparingly. Remember that the greater magnification is obtained at the sacrifice of a larger field, and that it is always best to show as much general relation between the parts of the object as is possible.

Children are fond of looking at small insects, wings, feathers, seeds, moss, sand, etc., and it is quite safe to expect that the older people will enjoy them as well. With adults, however, this difference will be noticed, more attention can be given to the details, and particularly to the adaptation of parts to the use for which they are made. Also the maturer mind will take pleasure in observing the similarities or differences between two or more closely allied objects.

Generally speaking, a lady will be interested in botanical subjects—pollen, sections of leaves or stems with their various forms of cells and their

contents, but it is the man who will give the sections of wood the closest attention. If your friend is aged, be considerate of the eyes that have passed their prime, but never allow him to feel that he cannot enjoy the pleasures the others are receiving.

Put on the stage an object that has both thickness and color, as crystals of bichromate of potassium, or sand—or a flea—something that will not be difficult to get a focus that will show satisfactory even if it be not the best. Encourage him to remove his glasses and take time to adjust the focus to suit his eye, and the sincere delight which he will show when he finds that he can see as well as the others, will make you patient when the next one declares that it is no use in his trying to see.

Do not forget the children of the poor—or the very ignorant. A simple thing which I never knew to fail to draw attention is a fine handkerchief placed over the stage—and having caught their interest it is easy to go on, and one can never know but it may be an incentive to some waif to struggle up into greater knowledge and light.

I believe we may interest people in the microscope—not our own facts, it may be—but in something that shall give them instruction and pleasure, if we will but give it sufficient thought.

By Miss Ella M. Drury, Boston, Mass., *In Practical Microscopy.*

The Esculent Swallow.

At the present time, when the eyes of all nations are turned towards the Orient, anything related to the Chinese people or their customs becomes invested with a peculiar interest. So when we read that they regard a pud-

ding or a soup which is made of a swallow's nest, as the greatest possible delicacy, we are inclined to think that they must have a very perverted taste. And so they have, judging from our point of view, or from the information we can gain by an examination of the nest of any American species of swallow. But, when we investigate the habits of the peculiar species which builds the nest which they eat and learn the manner of preparation, our wonder diminishes, and those Americans who have tasted the delicacy inform us that they are justified in their fondness for it.

The Esculent Swallow, *Hirunda esculenta*, seldom has a representative in the collections of American naturalists. It is a small bird, scarcely larger than a wren, though the spread of its wings, and the length of its tail, gives a much larger appearance. It abounds near the coast of many of the islands of the East Indies but more especially of Java. The southeastern coast of this island consists, for upwards of one hundred miles, of a perpendicular precipice several hundred feet high, against which the waves beat with almost incredible force. Into the face of the precipice, deep caverns and crevices have been worn, and it is here that these birds congregate in immense numbers, not merely as a breeding-place, but as a place of permanent abode. They build their nests in the fissures of the precipices, and in such inaccessible places, that, although they are often in plain view, man, with all his skill, and stimulated by an almost fabulous value of the nests, is able to reach but a small percentage of them; not enough to diminish the number of birds in the least.

Most of our American Swallows have the faculty of making their nests of mud adhere firmly to a perpendicular surface; but this faculty seems to be wanting in the Esculent Swallow. It must have a projecting shelf for its nest to rest upon; and as the precipice does not afford satisfactory locations, it proceeds to build one for itself. In the back part of the bird's mouth, near the root of its tongue, are located two large glands. Some anatomists say that they are identical with the salivary glands and others that they are distinct; but be that as it may, their function is to secrete a thick, viscid, substance much resembling a concentrated solution of gum arabic. It has the property of quickly hardening when exposed to the air, and it then presents the appearance of a piece of transparent white horn. Professor Troschel, of Brown University, made a careful chemical analysis of a large number of samples, and found it to differ but slightly from saliva.

When the bird wishes to build its nest, it hovers for an instant, directly in front of the selected location; then darting suddenly forward, it presses a drop of this substance against the wall.

This operation is repeated from twenty to thirty times, or, until the supply is exhausted. Then its mate does the same. A few deft touches in arranging, and the work is completed for one day. The following day the process is repeated and so on until a shelf has been built, large enough to support the nest, which is constructed of small sticks and pieces of sea-weed, cemented with mud. It is the shelf, and not the nest which furnishes the article of commerce. The nest with its contents is thrown into the sea.

When the shelf is destroyed, the bird immediately begins to rebuild, but this time it cements bits of wood into it, so that it is of inferior quality. The third it uses more foreign substances, and the fourth time it incorporates such a large proportion of foreign substances that the nest is worthless for commercial purposes. It is therefore not disturbed. The secretion also becomes darker at each successive period.

When gathered, the nests, or rather the shelves, are carefully washed and sorted and all foreign bodies are removed. Then they are packed in small bags, made of woven bamboo fiber, and are ready for market. Nests of the first quality are sold for a sum equal to about thirty dollars a pound. The second quality brings half as much; and the third varies from ten dollars to almost nothing. The total sum expended by China for these nests equals not far from a million and a half dollars, which represent the destruction of about three million nests. These figures, may perhaps, give some idea of the immense number of birds which flock to their favorite locations.

Lincoln Park, Chicago, Nov. 24, 1894.
Mr. Walter F. Webb.

My dear Sir: I must say that your first number was very fine, and if you can keep it up you will have one of the finest publications in the country. You have my best wishes for its success.

Very Truly Yours,
FRANK C. BAKER,
Secretary and Curator.

FOR SALE. (Curiosity) A double-headed calf, mounted, true to nature, with two noses and four eyes. It is of a nice color, standing on a fine postament and worth \$50. Best cash offer takes it.

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ALLIGATORS stuffed, standing erect, or crawling, 10 to 12 inch, prepaid for 60c. Order at once. W. F. WEBB, Albion, N. Y.

ARTISTIC EMBALMING.

Naturalists, Taxidermists and Amateur Collectors—Attention!

It would be idle to represent the process of embalming to the collectors and first-class taxidermists of America, as just as good as skinning and mounting. Honesty forbids the assertion.

To those who have long followed traditional methods of mounting, and have acquired proficiency, the advice is given, to follow the method which you have learned at the expense of time and labor.

But, there are thousands of busy men and women, and boys and girls, who are desirous of learning a method of preserving and mounting birds, who have no opportunity, or who cannot afford the expense which is sure to follow.

A suitable work on Taxidermy costs from \$5.00 to \$10.00, after purchasing which, a beginner has to lay in a supply of needed tools, at a cost, varying from \$5.00 for the cheapest, consistent with good work, to \$25.00. In addition to which, there is the expense of other items, too numerous to mention.

If instruction is received from competent teachers in the art of taxidermy, the cost will be from \$10.00 to \$50.00, and very often pupils fail to receive satisfaction, as all know.

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The February Nidiologist

contained a comprehensive article on the "Habits of the California Condor," or Vulture, among other interesting things, describing a perilous expedition after their eggs; with half-tone illustrations of old and young Condors; another striking feature of this article being the story of a CONDOR HUNT, graphically told by the hunter himself.

IN THE MARCH NUMBER

the taking of the California Condor's egg (now owned by H. R. Taylor) is described by the collector of it, furnishing valuable information hitherto unknown, about this extremely rare species. This narrative, from its very uniqueness, is far and away the most interesting to the Ornithological world, of anything which has appeared for a long time. An excellent half-tone illustration accompanies this article.

OTHER ILLUSTRATIONS and articles in this number more than sustain the reputation of the magazine. The Nidiologist is literally *indispensable* to all "up to date" Ornithologists and Oologists.

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VOL. I.

NO. 6

APRIL, 1895.

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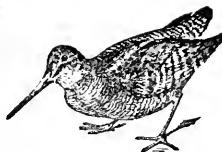
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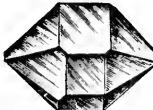
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THE MUSEUM.

A Monthly Magazine Devoted to Research in Natural Science.

VOL. I.

ALBION, N. Y., APRIL 15, 1895.

No. 6

The Deposit in Nesting-Trees of *Chaetura pelagica*.

In the January MUSEUM Mr. C. O. Ormsbee, of Montpelier, Vt., gives an interesting account of the nesting sites of the Chimney Swift, (*Chaetura pelagica*) in the years before the chimneys of civilized man were adopted in place of the large hollow trees of the forest.

He speaks of one such tree "the diameter of the hollow of which was about fifteen inches. This cavity was filled for a depth of seven feet with the same material (excrements and feathers) as the one described by Wilson."

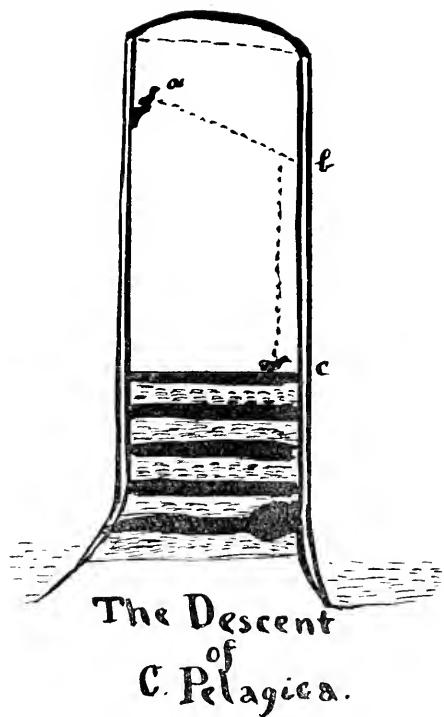
"Now," he says, "had the feathers been scattered promiscuously throughout the mass there would have been nothing remarkable about it; but such was not the case. The feathers were nearly all carefully arranged with the quills pointing out and the plumes pointing towards the center of the cylindrical mass, and were mostly arranged in layers, each layer being between an alternate layer of refuse. * * * But this arrangement is by no means the most curious circumstance connected with the deposit. Scattered through the mass were a large number of wing and tail feathers arranged with relation to each other, exactly as they belonged in the living bird. In many instances the secondaries were occupying their relative positions, both in relation to one another

and the primaries. In no case were any other feathers than those of the wing and tail so found, and in no case were any bones, beaks, claws or other parts of the bird found. Now the question arises how came these feathers in this position? They could not have been dropped by the living bird nor would any bird or animal have sufficient intelligence to so arrange them. The most reasonable conclusion seems to be that the birds died, and were buried by the accumulations above. But in this case what has become of the remainder of the bird? * * * The question remains unanswered, and we await replies."

Now, it seems to me from the above, that there can be but one explanation of this deposit and that a perfectly natural and simple one. First as to the layers, one of excrements, then one of feathers. I may as well state here, that the feathers, arranged in so orderly a manner, are undoubtedly those of the young birds who fell from the nests in the breeding season when they first tried their wings. After the breeding season the cavity would, of course, be used as a roosting place at night, as the chimneys are now, for about two months (July and August) during which time the excrements from the immense colony would collect and form a layer of some little thickness, which would be increased by the deposits of the birds, the next spring when they returned from the

south. As about a month or more would have elapsed, after their return, before the young would have hatched, the layer of excrement would be increasing, and the young, by the first or middle of June, would have become well grown, and as in all young birds, would soon be trying their wings.

Now the tree is, of course, dark inside, the birds gaining access through some large hole near the top of the tree. The nests, being attached to the inside of the remaining shell of the tree would, evidently, all have their brims in the shape of a semi-circle, facing the opposite side. When the young birds have sat on the edge of the nest for a day or so, according to custom, they would naturally give a jump, and spreading their wings, in many cases, fly bump! into the opposite side of the tree, for a young bird cannot, at first fly *up*, but on an inclined plane, *down*. Let us follow one of these birds. Stunned by this sudden end of his journey, the bird would fall at once to the bottom of the tree, perpendicularly, and this additional fall, and the gases arising from the excrements, would be enough to kill an ordinary young bird and especially so as the collision with the tree would crush his skull, being in the young bird very soft. Here then is the unfortunate nestling, lying dead or dying, with its head pointing in very nearly the same direction as when it flew from the nest (a) against the opposite wall (b) that is "with the quills pointing out and the plumes pointing toward the center" as shown in the drawing representing a half section of the tree. It would thus be seen that it would be more difficult



for the bird to land in another position than that just described. (c)

Here then we have accounted for the arrangement of the feathers. Now after the bird dies, decomposition quickly sets in. In young animals of all sorts the bones are composed in a great part of animal matter, which by this time in our Swift, would have assumed the character of very stiff, tough, cartilaginous strings with points or centres of ossification formed. Thus the bones would also rot, though undoubtedly taking a longer time than the flesh, and what lime there might be in them, at the most, would be a network of fine strings, as it were, which would easily fall away, aided by the pressure of accumulations from above, and be reduced to a powder. The beaks and claws, being even in the old birds soft

and weak, and in the young bird little better than tough skin, would soon disappear, by the process of decay. Then only the feathers would remain, and as we all know these being composed of horny material would not rot, owing to lack of organic matter, and then being soon covered over, would be preserved for many years. A feather, when it is grown, dies and merely sticks into the body of the bird; hence it is made of incorruptible material, or it would be decaying while on the bird. I have often noticed skeletons of birds exposed to be crumbling while the feathers were found perfect still, though a little be-draggled by rains.

As many other nestlings would undoubtedly follow this one we have traced, a layer of feathers would soon be formed and after the breeding season the layer of excrements would cover it over, as above described.

Here then is an explanation, which I think will satisfy all questions, and if not, I, too, "await replies."

GLOVER M. ALLEN,
3 Vernon St., Newton, Mass.

Among the Rockies.

PROF. M. J. ELROD.

Teacher Natural Science, Illinois Wesleyan
University.

II.

Emerson says to know a mountain you must put it under your feet. Whymper, the great traveler among the Andes, as well as the Alps, smiles at a mountain that can be ascended in a carriage or on horseback. Conway,

who has recently returned from a year of climbing among the highest of the Himalayas, would run up a mountain like Pike's Peak as an outing for breakfast. Yet to get to the top is a task for one not used to it, and many cannot reach the summit, unless they take the cog road. But no naturalist would for a moment think of going up any other way than on foot. Hundreds of people walk up every year. Old and young alike climb to the top. I have read of an old man of 70 and a young boy of 8 who made the ascent. There are no crags and cliffs that cannot be rounded, and altogether it is an easy mountain. Indeed there are few of the Rockies that cannot be ascended as easily. I have climbed to the top twice and if I ever get there again, as I hope I shall, I will climb it again.

The rock of this mountain is a peculiar reddish-brown granite, quite hard, and capable of taking a very fine polish. It is readily cut into convenient and suitable sizes for building purposes. The visible rock is mostly boulders of all sizes and shapes, piled one upon another promiscuously. Near the base and for a long way up the boulders are large. Toward the top they become smaller, and of more uniform size. One naturally imagines the very top of a mountain to be flat, and easily walked over. On the contrary, the top of this, as of most mountains, is of very small extent, and is a mass of boulders, obliging one to hop from stone to stone to get around.

At the summit of Pike's Peak is a government station of the Weather Bureau, for taking observations. The

lot of the observer is not enviable. In the winter all trains on the cog road are stopped, there is no way of getting down save by snow shoes and burros, the wind blows furiously, the thermometer gets low, the air is so rare that little exertion can be engaged in without great fatigue, and there is little to relieve the monotony. It is the highest place in the world where civilized man lives the year round.

There are many things that impress one who stands on this summit for the first time. On my first ascent we arrived at the top at 6:30 in the evening, clothed in summer garb, in early August, and of course were doomed to spend the night there. No one of the party could have gotten down. We were nearly gone—in many ways. Any of the rocks seemed soft to lie upon, and to lie and breathe without exertion was indeed a luxury.

The changes in temperature are quite noticeable. At night it is cool. It is so in all high altitudes. When one reaches the altitude of 12000 feet, one-third of the atmosphere has been left below. At Pike's Peak this altitude is exactly at timber line. As soon as the sun sets or goes behind a cloud the rocks that have been warmed radiate their heat, and there being little in the air or space to impede it the heat goes off into space, soon leaving the rocks cold. Precipitation at such altitudes is mostly in the form of snow or hail. When the sun shines, it is likewise correspondingly hot. Evaporation is rapid, and the moisture is taken up very rapidly. Conway tells us in the Himalayas that at an altitude of 16000 or 18000 feet, where six inches of snow fell on his tent in

the night, it would be melted and the tent dry in a half hour after the sun shone upon it. During thunder storms the electrical manifestations are very marked, though personally I have not had much experience in this line, much as I have sought them. But it is a very common occurrence to have such electrical induction as to make the fingers and ears tingle, and even to charge guns and other objects so as to make it difficult to handle them. It is difficult to do cooking on account of the rarity of the atmosphere. At timber line one is obliged to boil coffee for a half hour before it has a coffee taste. We, one day, tried to make soup with squirrel and grouse, and after boiling from eleven to half past one, gave it up.

But what most people go up for is the view from the summit, 14147 feet above the level of the sea, and over 8000 feet above the level of the plain at the base? The first time I ascended I camped high enough to make collections of birds and insects. The second time my party lugged a photographic outfit to the extreme summit only to find ourselves in such a blinding snow storm that to take a picture was a physical impossibility there was nothing visible to take. But the view at sunrise on a clear morning is sublime. Far away to the east the first streaks of dawn are seen. The altitude of the arc of light becomes higher, its azimuth wider. Lighter and lighter, the color gradually changes from that beautiful color seen at early dawn to that roseate tint which transcends all description and surpasses the work of all artists, and which heralds the king of day. The plain in

the distance appears like a cloud. Our horizon has a radius of 100 miles. The sun slips from behind the bank, the tops of peaks below become illuminated; as the sun ascends the rays descend, the shadows in the city at the base disappear, the earth as far as the eye can see is visible, and it is day. The sight pays for all the hunger and fatigue of the climb, and for the misery of the night.

On such an occasion we for the first time saw the beauty and sublimity of mountain peaks and ranges. I would rather give up all my insects, birds and plants collected in the mountains, than to have blotted out this one glorious view, which cannot be told in words.

Far and near, peak after peak is seen, some pointed and abrupt, some glittering in the sun's morning rays, and others yet hidden in the shadow of some larger mountain. Denver is seen 90 miles to the north, Pueblo fifty to the south. The first peak southward and one of a few above timber line, is Old Baldy, where we camped for a week. Between this and the plain are Monte Rosa and Cheyenne mountain. Eastward, down at the very base of the Peak, is the Garden of the gods, its red sandstone glittering in the sunlight like molten metal. Yonder is a little lake. It seems but a few minutes' walk away. Alas! it is twenty miles distant, and it would take an hour to row around it. Little valleys and little plains appear everywhere, but they are miles in extent. And, indeed, the cliffs, crags and rough places of the day before have disappeared. They are blended in the general view.

We have conquered the mountain and put it under our feet.

Does it pay to walk up and down Pike's Peak, endure the fatigue, the cold, the heat, the delay, when one can ride on the cars or in a carriage? As many times as I go to the summit I will climb. The hunger, fatigue, cold and heat are nothing as compared to the glories of the visions by the wayside, the peeps from precipices, the bouquets from a cliff, the sight of that rare animal, the pica, the catch of an alpine butterfly, the pure water from a trickling stream, or the call of an Ousel from the roar and tumble of a mountain torrent. The true naturalist will surely take nature as she is. The roar and screech of the locomotive has too much of an every day sound for mountain thoughts. The smoke hides the clear blue above. The very numbers of people break the charm. But the inspiring atmosphere, the clear heavens above and the rocky floor beneath, the solitude and silence of a high mountain, the chirp of the mountain bird, or call of the squirrel, can be appreciated to the fullest extent only by the foot passenger, who can climb to an eminence and reflect, lie upon his back and breathe, or stand with bared head and throbbing heart in the presence of Him who is the source of all these beauties and glories.

Above timber line there is in summer a profuse growth of alpine flowers. On sheltered or sunny slopes there is a varied vegetation, the flowers making a beautiful sight. One of these visions was the most gorgeous I have ever seen or ever hoped to see. Being caught in a shower of rain, hail and sleet, I hast-

ened to a large rock, and by clinging with both hands and feet in a ridiculous manner I was somewhat protected. After an hour the storm cloud passed, and the sun came out bright and warm. Sunshine always brings out insects, if they are about. The storm left a deposit of snow and sleet an inch or two in depth all over the surface for miles around. Above this snow, showing their varied colors, were thousands of flowers, principally, *Actinella acaulisnutt.*, *Allium* sp., *Actinella grandiflora* Gray, *Mertensia alpina*, *Silene acaulis*, *Castilleia* sp., *Polygonum bistortoides*, *Geum rossii*, *Sedum roseum*, *Potentilla fruticosa*.

Hovering over these flowers were hundreds of butterflies, displaying their gorgeous colors and flitting from flower to flower in ignorance of the beauties of the sight. The butterflies were *Parnassius smintheus*, *Colias ochraeus*, *Colias meadii*, *Argynnis eurynome*, *Phyciodes nycteis*, *Argynnis helena*, *Lycaena rustica*.

Such a blending and contrast of colors is rarely seen, and forgetting the place and circumstances, I stood for a long time drinking it in. This view is indelibly stamped on my memory as one of the most sublime periods of my life. Soon the mournful squeak of the pica on the rocks near called my attention, and a few shots filled my pockets with these coveted tailless rodents. In a short time the snow had disappeared, and the six mile walk to camp was cheerfully made.

I cannot close this paper without telling the readers of the MUSEUM how the workmen on the cog road go "down town," though it has nothing to do with natural history that I can

see. The locomotive, tender and coach combined in one is rigged up as follows: An ordinary cast-off shovel, without handle, is taken, the stump of handle ahead, the cowcatcher. Beneath is riveted a piece of iron, lengthwise of the shovel, and projecting downwards, so as to go between the two rows of cogs, in the center of the track, into which machinery of engines fit. This piece is to guide the concern, and keep it from falling sideways. Lastly, a piece of board is fastened behind, to lean back upon and create friction when the train goes too fast. The shovel is placed on the cogs, with the strip between the rows, the traveler takes his seat, crosses his legs, is given a shove, and is gone. I saw some of them start—that was all. They go a half minute or so apart so to avoid a collision. As the cogs are well oiled and the shovel greased this is about as near "greased lightning" as one can imagine. If the speed becomes too rapid, the brake is applied by leaving back upon the board behind, and the train slacks gradually, or stops. It is one of the quickest and most ridiculous modes of travel imaginable.

Spring Notes, 1895.

BUFFALO, N. Y., March 23.

Editor The Museum:

I have just returned from a tramp over the fields and thought I would tell you of another "lost opportunity," from an ornithological standpoint. It was fine this morning so I took my new puppy out to give him exercise and experience. Did not take gun as it was too hard frozen for snipe, but took a revolver to get puppy used to

the noise of shooting. I was out in a stubble field about five miles from home, when I heard a bird note which I thought was a Bluebird's as I was looking for them, so I gave the Bluebird's call and pretty soon saw a bird up in the air. It had changed its note, however, and imitating it I soon called it down, but the puppy flushed it before I saw what it was. I marked it down again, and holding the dog in, approached cautiously and saw it was a Lapland Longspur, (*Calcarius lapponicus*) in beautiful spring plumage. I had shot it only once before, (January 30, 1889) and was anxious to obtain it. At the risk of making my dog gun-shy, I held him and crept up to within 15 feet of it and shot at it with a shot cartridge from a .38 cal. 4-½ in. barrel revolver, but did not harm it. It alighted again in a furrow where it was moist, and I crept up to same distance, and fired without result, although I hit it both times. I flushed it next time and then had a third chance at not over 12 feet, when being hit harder it flew out of sight as I watched it with disappointed gaze. I examined cartridges and found they did not have powder enough to be of any service whatever, and I missed a rare bird in consequence.

I made a beginning on eggs this season by collecting a set of two, Great Horned Owl on March 11th. On the 7th I took a trolley car to City Line, and walked to Lake Shore to a piece of woods one mile long up to one half mile wide, extending from Stony Point to Smolk's Creek. Was fortunate in finding nest in the second tree I examined. It was in the top of a stub, and I found it by seeing the female's tail projecting. Did not disturb her at all

as I did not have my climbers. Was not able to get out again till the 11th, when I went prepared, and with the assistance of a friend living near there, obtained two fine eggs incubated about a week.

I first climbed a near tree to get a snap at Mrs. Bubo at home, but as she was adverse to receiving strangers I had to be content with a chance at her house. * I next waited half an hour to get a picture of her return, and succeeded as she spread her wings to sail into nest. You will notice up in the left hand corner that I got two other birds on the wing. The smaller is a Crow and nearer is a Goshawk (*Accipiter atricapillus*). You may be surprised at the latter, but I feel sure of the identification as after following Owl to nest it sailed around half a dozen times over me just at the top of the trees, and I had an excellent opportunity to observe it. My friend could have shot it as he had the gun in another part of the woods, but he was afraid of scaring the Owl.

While waiting for the return of the Owl a Mink passed me within a dozen feet. I snapped camera at it without aim and did not find it in picture. Got another snap as Owl jumped out of nest and before she opened her wings, but plate was overexposed. After this I climbed for the eggs and my friend did some snapping my friend standing at foot of Owl stub. The stub is 43 feet high. This is the third set I have taken from this pair. Last year I found the nest on March 8th and took eggs on 10th from top of a stub 42 feet high. I lassoed the top from a

* Mr. Savage sent us nine extremely interesting views but for want of space we could only use part of two.



neighboring tree, and went across on the rope [see cut]. The Crows found this nest for me after I had looked for it on half a dozen days previously. It was right on edge of woods as you can see by picture.

The first set was the most difficult to get. On March 9, 1889, I took two eggs also from the top of a stub 52 feet high. This was an immense trunk covered with rotten bark so that climbers were of no use. The stub had a portion of a limb branching about five feet below top, and my plan was to fell a neighboring tree so as to cross this limb. With the help of friends the fifth tree we cut standing 30 feet away was guided into this arm and I made the ascent on this smaller tree without mishap. The Owl laid again that season, but somebody wanting a piece of nice white ash cut it out of the butt of my ladder tree and I could not get up again.

This pair seems to have a hobby of choosing stubs as sites for nesting. Most other nests that I have known of, have been in holes or in old hawk nests.

By the way, there is a most beautiful painting in the office of Mr. Hornaday the taxidermist in the Erie Co., Bank Building, which you must see when in Buffalo. It is called "The Ornithologist" and is rich. Mr. Hornaday is pleased to have interested persons see it.

The only migrants I have seen so far are Song Sparrow and Red-tailed Hawk.

Sincerely,
JAMES SAVAGE,

An Ancient Lake in Central Vermont.

By C. O. ORMSBEE.

In 1609, when Samuel Champlain explored the lake which has since borne his name, he discovered a river em-

bouching into the eastern side of the lake, to which he gave the name La Monette. Doubtless he was influenced in the selection of this name by the sight of the immense flocks of sea gulls which were found in that vicinity,—*monette* being a French word and signifying gull. But, be that as it may, the river was known for several years as La Monette. At length another geographer substituted the Indian name which, with its French orthography was *Ouinousquoï*. The name La Monette was at the same time applied to the river next north, which Champlain had named Le Sud. A still later geographer, copying partially from this map, neglected, in his drawing, to cross the “tt” and his engraver unwittingly substituted “ll”. The error was not discovered in time to be rectified, and thus the name of this river, the Le Sud of Champlain, became La Monelle. Two more orthographical changes were made and the name became La Moille, by which name the river is now known.

But to return to the original La Monette river. After the substitution, it was generally known by its Indian name, upon the French maps, until the close of the French and Indian war, when France relinquished all claim to territory in North America. Meantime Canada had become peopled by a class of men scarcely superior in civilization to the native Indians. Like them, they subsisted chiefly upon the products of the chase, and, in search of game, or adventure, they roamed the vast wilderness from one extremity to the other. In their excursions to the headwaters of the Connecticut they generally made use of the valley of the La Monette or Oninousquoï as a

highway. Hence the English cartographers, in their maps of the country re-named the river and called it French river. It was legally known by this name, and in the charters of the towns along its banks, some of which were dated as late as 1763, it was so-called.

The people who next traversed the country were English descent, they were a shrewd, sensible, observant people, with little knowledge of books but intensely practical. To them, the term French river had little significance except to remind them of their late enemies. Noticing the quantities of wild onions, which grew along its banks, and which they often gathered and stored for winter use, they named the river colloquially Onion river. In time this became the general name and it was so called until about fifty years ago, when, for the purpose of giving a more euphonic name to the river upon which the capital of the state of Vermont is situated, its Indian name, was, by common consent, restored; but with its orthography, and doubtless its pronunciation changed, so that it is now known as the Winooski river.

Small, being but sixty-five miles in length and draining an area of less than one thousand square miles; navigable in no place, it has little commercial importance, except such as is afforded by the numerous mill-privileges with which it abounds throughout its entire length; less than one-tenth part of which, however, are utilized. Hence it is, that this river rarely receives notice. But to the student of nature, investigating and inquiring into the past history of the continent, no river in New England possesses greater interest; for it is in its valley that the his-



Voluta imperialis, East Indies. A rare species; hard to secure.

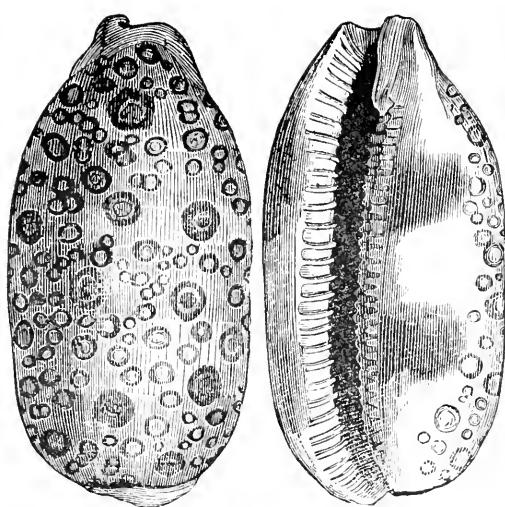
tory of an important geological change is recorded; and so plainly is it written, that even the most casual observer cannot fail to notice and read, at least a portion of it.

About forty miles from the mouth of the river, its valley is crossed, nearly at right angles, by a spur of the Green Mountains, which, branching from the main range, extends in a more north-easterly direction. This range, where it crosses the Winooski valley, is not far from two thousand feet in height; but it is cleft by a chasm, the result of a fracture during a geological upheaval, which extends to a level with the valley, and through which the river finds an easy passage. Here, at the foot of the mountains, upon the east side, and partially in the chasm, and upon the right bank of the river, is the little village of Middlesex.

Opposite this village, which contains perhaps, one hundred and fifty inhabitants, the river, for a distance of eighty rods, flows over a naked ledge of slate-stone into which it has worn a channel in places more than fifty feet in depth, and of a sufficient width to admit of the tolerably free passage of the

stream. This channel, it is plain to be seen, is the result of erosion; and obviously, before its excavation, the ledge through which it is cut, must have formed a barrier across the river, the result of which must have been to form a lake above, and a cataract, or at least, a series of falls below. The topography of the surrounding country is such that no other conclusion is possible.

In looking for traces of this lake we find, about a mile above the village, and on the left bank of the river, a mountain spur, jutting out towards the river in such a manner as to have formed a huge promontory in the lake. Here, upon close examination, we find horizontal grooves cut into the soft slate rock of which the mountain is composed. Evidently they were made by the waves of the old lake. Above these wave lines, the soil which thinly covers portions of the almost perpendicular side of the mountain, is of a different nature from that of adjacent localities. It contains very little of the original drift, but is composed of disintegrated and pulverized slate stone mixed with such materials



Cypræ argus Eyed Cowry, New Caledonia.
Cuts show both front and back of shell.

as might have been washed from above, beneath the soil. The rock has not the angular appearance ordinarily found when the soil is removed from similar rock. Instead, it is rounded, apparently by the action of the elements, to which it seems to have been long exposed.

Ascending still higher, at an elevation of about one hundred feet above the wave lines, we find another series of wave lines, larger, and more distinct than the first. These prove that the lake must have had, at two different periods, two distinct levels; and showing, moreover, what an examination of the chasm does not reveal, that a second and higher barrier must have existed, contemporaneously with the lake when at its higher level. No trace of the second barrier is now to be found. Between the two series of wave lines, the appearance of the mountain is such as to lead to the conclusion that it has at some time been

washed bare of all soil and partially recovered by the slow process of nature. Its position with reference to the valley is such that if a barrier did formerly exist which raised the waters of the river to the height indicated by the upper series of wave lines, and that barrier was suddenly removed, the rushing waters would have borne directly against it and a complete denudation must have resulted.

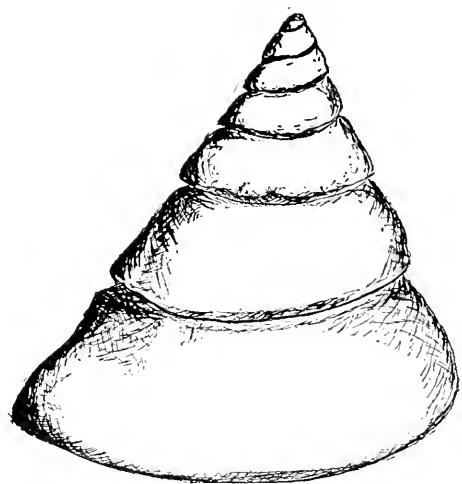
Six miles above Middlesex village, at the junction of Winooski river with Worcester branch and upon both sides of the latter stream, is the city of Montpelier. From levels made by the engineer in charge of the construction of the railroad, it has been ascertained that the lake when at its lowest level, covered the greater part of the business portion of the city. A short distance below the city the river receives the waters of Dog river and a little ways above it is joined by those of Steven's branch. About seven miles northeasterly is a mountain locally known as Long Meadow Hill; the foot-hills of which reach to Montpelier and form a watershed between the Winooski river and Worcester branch. Towards the later stream the sides of the mountain are steep and precipitous, but towards the river they slope more gradually and the mountain divides itself into numerous, radiating spurs, extending towards the east and south. The spur which reaches Montpelier is about one hundred and fifty feet above the old lake when at its lower level and extends toward the angle formed by the union of the two streams in such a manner as to have formed a jutting promontory into the lake when it was at the higher level.

Now when two streams meet and

join in a lake, the uniting currents form a reflexive, wave-like current which sets back towards the headland which separated the streams. This current gradually ceases, from lack of propulsive power, and deposits a sediment, particles of sand and silt which the water held in suspension when in more rapid motion. This is invariably the case and if the head-land is near enough the silt will be deposited upon it, forming a sand-bar which, in time will become a fertile meadow. The action of the waves in beating against it and returning as an under-tow will cause the sides to assume a nearly perpendicular position. If the head-land is too far from the angle of the uniting streams for the reflexive current to reach with its burden, the silt will be deposited upon the bed of the lake and there form a conical shaped hill. Owing to the waves, such hills seldom reach the surface.

Now, if the theory that the lake once existed, the surface of which coincided with the upper series of wave lines, be true, we shall find a deposit of silt in the angle of its currents; and if the theory that the lake was suddenly chained, as by the bursting of the barrier, be true we shall find that the sides will be as nearly perpendicular as the material of which the deposit is composed will admit, but if the lake was drained gradually, then the sides of the deposit will have a correspondingly gradual slope.

Let us then see to what extent the facts support the theory. In the eastern part of the city, joining the head-land and extending towards the junction of the two streams and exactly where we should naturally expect to



Trochus niloticus. Pearl Trocicus, China, Singapore. A beautiful Banded species, but most frequently seen in polished state, as per cut.

find it, is a perfectly flat plateau, composed entirely of silt. Moreover its elevation corresponds with the height of the upper series of wave lines. Thus the first part of the theory is sustained. The sides of this hill, which by the way is locally known as Seminary Hill and upon which are located the Methodist Seminary, the United States Arsenal and many private residences are so steep that it is only by a long circuitous route, or by an expensive system of grading that the plateau can be reached by teams. In places it appears as though large portions of earth near the edge of the plateau had loosened and slid down the steep side of the hill. The cohesion of the particles of earth was not sufficient to sustain the entire deposit in places when the water was withdrawn. The original surface has been changed by cultivation and by grading, but still its whole appearance corroborates the second part of the theory.

TO BE CONTINUED.

THE MUSEUM.

A Monthly Magazine devoted to Ornithology, Oology, Mollusca, Echinodermata, Mineralogy and Allied Sciences.

**Walter F. Webb, Editor and Pub'r,
Albion, N. Y.**

Correspondence and items of interest on above topics, as well as notes on the various Museums of the World—views from same, discoveries relative to the handling and keeping of Natural History material, descriptive habits of various species, are solicited from all.

Make articles as brief as possible and as free from technical terms as the subjects will allow. All letters will be promptly answered.

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**WALTER F. WEBB,
ALBION, OALEANS CO., N. Y.**

Entered at Albion post-office as second-class mail matter

NOTES.

How many of our readers in eastern U. S. were as successful as Mr. Savage of Buffalo, N. Y. in finding the home of the Great Horned Owl.

With this number we usher in the collecting season in nearly all branches of science and in practically all parts of the U. S. We recall with pleasure the many sets of "Red-shouldered" taken in April and the many fruitless searches after "Screech Owl" and the "Prairie Horned Lark." Now is the time to pick them up, if you want fresh eggs.

We want to hear from all our friends in the field this spring with notes on their "takes." Be it, eggs,

birds or mammals, rocks, fossils or insects, let us have a line from you if only a postal stating anything new you have discovered, or dates specimens were taken. Collectors of small mammals send notes and lists of all the varieties taken in your section. We have a large list of "mammal readers."

We had a pleasant call a few days since from Mr. John Knox of Silver Creek, N. Y. A more thorough paleontologist is hard to find. Mr. K. is in a splendid locality for collecting such as spirefers, various species; numerous fossil corals, crinoids, and several varieties of atheys,—he having sent them all over the world.

We are indebted to Mr. Frank L. Burns of Berwyn, Pa., for copy of Bulletin No. 5 of the Wilson Ornithological Chapter of the Agassiz Association, consisting of exhaustive notes on The American Crow *Corvus Americanus*. Mr. Burns was chairman of a committee on special investigations of the above species, and has made a careful and thorough study of *C. Americanus* for the past four years, with the result that he has now given to collectors doubtless the most comprehensive treatment of the American Crow ever attempted. We regret that space this issue will not admit of our giving a more extended notice, but may in a later issue publish a review of the many interesting facts contained within its pages.

We notice one of our exchanges criticizes the price we placed on eggs and skins of the California Vulture in our

new Ornithologists' and Oologists' Manual but we are inclined to think from a perusal of the correspondence he has published and notes on the so-called *rare* Avis, that the criticism is without question not called forth from facts as they stand. After reading the notes from the various collectors throughout California, from San Francisco to the extreme south of Lower California and Mexico, a breeding range of nearly 1000 miles, and noting the immense numbers of birds seen and taken, we are loath to class the species with the Labrador Duck and Great Auk, even if our esteemed friend possesses an egg or even in view of his magnanimous offers. We sincerely hope for his sake that he is able to create a boom on the species in question and sell the specimen for a good round price, although we are not aware he has offered it for sale. For years European collectors have paid fancy prices for certain birds and eggs from the United States, and for a time they have been over priced and later taken a drop only to remain there. Our advice from experience in handling eggs of birds not extinct nor in any wise likely to become so in our generation is, to beware of paying over \$15.00 for any one egg. We priced the skin at \$50.00 and the egg at \$25.00 and still believe it is a very conservative figure. Let us hear from collectors in the east and see what they have to say.

The Pleasures of a Spring Day.

BY FRED W. PARKHURST.

Who has not been thrilled with pleasure upon viewing the beautiful green tint which the fields have com-

menced to take on, the budding trees, and inhaling a full breath of a gentle spring breeze as it softly sways the tender green leaves of the trees? Surely everybody must be touched in some measure by such a scene, and many there are who regard it as one of the chief pleasures of life and one they would forego all else to secure. What a delight it is to a true lover of Nature to stroll off through the fields and forests in an aimless manner as to destination, but with the fixed idea of absorbing at least a portion of the beautiful which everywhere is strewn in such boundless profusion. And the more one observes the more one will find to observe. Before we have hardly left the shelter of our roof we hear the shrill, though pleasant, notes of the Robins, as they call back and forth to their respective mates, and chatter incessantly upon the all important subject of nest-building. As we leave the yard and pass by the old apple tree just out the gate, we observe a few straws protruding from a large fork. As we approach a little nearer, and stop for moment, we are greeted with the sharp cries of fear and distress which is so characteristic of this characteristic bird, and has been the cause of many a boy's disgrace and punishment, and I must plead guilty of being convicted myself. Leaving the apple tree, we wander across the fields, and as we near the bank of a turbulent little stream, swollen by the spring rains, our ears are struck with the peculiar notes of a White-breasted Nuthatch, which is very briskly revolving around an old popular stub on our approach, as if fully aware of our being dangerous, yet not willing to do more than place the stub between us. The re-



Crow feeding young--Drawing from photo by a Lockport, N. Y., correspondent.

sonant tapping of a Hairy Woodpecker also goes to make up the complement of spring sounds. Among the vocalists the Song Sparrow is certainly a star performer, and the Bluebird, perched on the topmost branch of a massive elm, pours forth his contribution towards the general harmony in a manner highly praiseworthy. As we come to the soft loamy bank of the river we find a group of boys and old men patiently endeavoring to lure a few suckers from the muddy steam. A little farther down the bank a pair of muskrats are splashing about in a truly hilarious manner, while near the opposite edge three Buffle-head Ducks are warily coasting along, ready to

take to wing or go to the bottom, as occasion may require.

Crossing the stream, after a short walk we reach a small piece of woods, over which a pair of Red-tailed Hawks are lazily circling, yet with an eye ever ready to detect the movement of some incautious mammal, while the usual coterie of Crows are working themselves into an unusual state of excitement on account of the Hawks' presence. The Jays also are joining with the Crows in their attack on the intruders, although they prudently vent their anger in loud crys.

Everywhere evidence of God's goodness is to be found; in the birds, the flowers, the budding trees and the

green and verdant meadows. The sweet smelling arbutus and the dainty liverwort are everywhere abundant in the woods, and our ears are often startled by the buzz of a big cock partridge as it goes swiftly into the depths of the forest. On our return we come upon a Phœbe perched on a dry twig, jerking its tail in its own peculiar way, and now and then darting forth as some rash insect comes within the scope of its vision. The Kingfisher in much the same manner is perched on the dry overhanging limb of an oak near his favorite fishing pool, and occasionally makes a lightning like swoop to the waters below.

We have gone through with a few of the more important actors in this scene, but the view must be seen to be appreciated, and that can only be done by looking at Nature through Nature's God.

Notes on the Reported Extinction of the Genus *Achatinella* and Marvelous Development of a Florida *Fasciolaria*.

BY JOHN FORD.

A most extraordinary account of a collection of shells, located somewhere in the interior of New York State, was handed me by a friend a few days ago.

This purports to have been written by a correspondent of a Rochester newspaper, in the columns of which the article* probably first saw the light. The writer, it appears, does not claim any scientific knowledge of shells, nor can it positively be said that his bump of imagination is abnormally developed. Nevertheless, he has given to the pa-

per alluded to, and consequently to the world, some very remarkable bits of information. Information, indeed, which, if true, shows how puny are the geographical and scientific acquirements of the general run of conchological students. Of course, for lack of space in your columns, reference can only be made to one or two of the marvelous statements embraced in the article. One of these refers to the genus *Achatinella*, of which the writer says, "This shell is confined to the Sandwich Islands and its tenant feeds on the herbage of these islands. Since the islands have been pastured, the 'variety' has almost entirely disappeared, and probably not more than a half dozen specimens could be found there to day." What a dire calamity! and how remarkable that these pretty little creatures should have "shuffled off their mortal coils" in the very season that less regal robes slipped from the shoulders of their Island Queen.

A few flippant students may question this tale of *starvation* in the midst of *green pastures*, but it will perhaps be well for them to pickle their opinions, since the positive assertions of "correspondents" are not to be trifled with. The shell expert who can doubt this starvation story would quite as likely question the following narrative said to have been written by the "experienced collector" who forwarded the shell referred to, to the aforesaid unparalleled New York aggregation, viz; "The large Florida *Fasciolaria* father found one day by accident."

"While drifting about in Florida waters his boat suddenly touched what seemed to be a rock but it proved to be an immense specimen of the *Fasciolaria* (sic), alive and traveling." This

* As so many of our readers have read this article we thought best to publish the comments on same by a scientific conchologist.

specimen weighs several hundred pounds."

A brief statement to be sure, but a graphic one, as the reader will admit. There is not a word, however, as to whether the boat was wrecked in its "sudden" contact with the limy mass "weighing several hundred pounds."

Nor is there any reference to the final disposition of that part of "the *Fasciolaria*" which when struck, was "alive and traveling." But this fact matters little, perhaps, since we are assured that the "several hundred pounds" were gotten safely to the shore, and finally into that collection of shells which (I quote again) "is expected to be in a short time the most complete and valuable one, from a scientific standpoint, in the world."

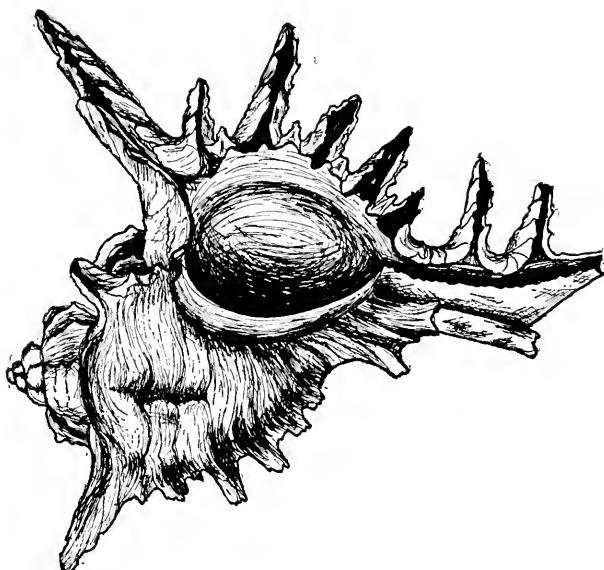
Presumably this monster of "Florida Waters" is known to Science as *Fasciolaria gigantea*, but alas! how pitiable has been the ignorance of the scores of so-called conchological experts who have hitherto believed that this, the largest species of the genus, did not exceed a paltry ten pounds in weight. Think of it, ye academic plodders who for years have been gazing with wonder upon a petty *eight* pounder, imagining the while that Florida had utterly failed to produce anything larger in the same line. O, the pity of it! You that have given years of study and thought to the molluscan world, how could you so mistake a pygmy for a giant, a veritable baby for a grandfather? Far better would it have been had you made a Mecca of the Empire State and sat at the feet of its astute correspondent, whose present throne is, doubtless, ye same old *Fasciolaria*, "alive and traveling" and "weighing several hundred pounds."—*The Nautilus*.

The Triumphs of a Taxidermist.

Here are some of the secrets of Taxidermy. They were told me by the taxidermist in a mood of elation. He told me them in the time between the first glass of whiskey and the fourth, when a man is no longer cautious and yet not drunk. We sat in his den together; his library it was, his sitting and his eating-room—separated by a bed curtain, so far as the sense of sight went, from the noisome den where he plied his trade.

He sat on a deck chair, and, when he was not tapping refractory bits of coal with them, he kept his feet—on which he wore, after the manner of sandals, the holy relics of a pair of carpet slippers—out of the way upon the mantle-piece, among the glass eyes. And his trousers, by the bye—though they have nothing to do with his triumphs—were a most horrible yellow plaid, such as they made when our fathers wore side whiskers and there were crinolines in the land. Further, his hair was black, his face rosy, and his eye a fiery brown; and his coat was chiefly of grease upon a basis of velveteen. And his pipe had a bowl of china showing the Graces, and his spectacles were always askew, the left eye glaring nakedly at you, small and penetrating; the right, seen through a glass darkly, magnified and mild. Thus his discourse ran: "There never was a man who could stuff like me, Bellows, never. I have stuffed elephants and I have stuffed moths and the things have looked all the livelier and better for it. And I have stuffed human beings—chiefly amateur ornithologists. But I stuffed a nigger once.

"No, there is no law against it. I made him with all his fingers out and



Murex ramosus. White Murex, Japan Arabia, East Africa, etc., One of the most common and best known of the Murex family.

used him as a hat-rack, but that fool Homersby got up a quarrel with him late one night and spoilt him. That was before your time. It is hard to get skins, or I would have another.

"Unpleasant? I don't see it. Seems to me taxidermy is a promising third course to burial or cremation. You could keep all your dear ones by you. Bric a-brac of that sort stuck about the house would be as good as most company and much less expensive. You might have them fitted up with clockwork to do things.

"Of course they would have to be varnished, but they need not shine more than lots of people do naturally. Old Manningtree's bald head. Anyhow you could talk to them without interruption. Even aunts. There is a great future before taxidermy, depend upon it. There is fossils, again."

He suddenly became silent.

"No. I don't think I ought to tell

you that." He sucked at his pipe thoughtfully. "Thanks, yes. Not too much water.

"Of course, what I tell you now will go no further. You know I have made some dodos and a great auk? No! Evidently you are an amateur at taxidermy. My dear fellow, half the great auks in the world are about as genuine as the handkerchief of Saint Veronica, as the Holy coat of Treves. We make 'em of grebes' feathers and the like. And the great auk's eggs too!"

"Good heavens!"

"Yes, we make them out of fine porcelain. They fetch—one fetched £300 only the other day. They are wholly genuine, I believe, but of course one is never certain until you get them and afterwards you have to get them dusty, for no one who owns one of these precious eggs has ever the temerity to clean the thing. That's the

beauty of the business. Even if they suspect an egg they do not like to examine it too closely. It's such brittle capital at the best.

"You did not know that taxidermy rose to heights like that. My boy, it has risen higher. I have rivalled the hands of Nature herself. One of the *genuine* great auks"—his voice fell to a whisper—"one of the *genuine* great auks *was made by me.*"

"No. You must study ornithology, and find out which it is yourself. And what is more, I have been approached by a syndicate of dealers to stock one of the explored skerries to the north of Iceland with specimens. I may—some day. But I have another thing in hand just now. Ever heard of dinornis?

"It is one of those big birds recently extinct in New Zealand. 'Moa' is its common name, so called because extinct: there is no Moa now. See? Well, they have got bones of it, and from some of the marshes even feathers and dried bits of skin. Now I am going to—well, there is no need to make any bones about it—going to *forgo* a complete stuffed Moa. I know a chap out there who will pretend to make the find in a kind of antiseptic swamp, and say he stuffed it at once, as it threatened to fall to pieces. The feathers are peculiar, but I have got a simply lovely way of dodging up singed bits of ostrich plume. Yes that is the new smell you noticed. They can only discover the fraud with a microscope, and they will hardly care to pull a nice specimen to bits for that.

"In this way, you see, I give my little push in the advancement of science.

"But all this is merely imitating

Nature. I have done more than that in my time. I have—beaten her."

He took his feet down from the mantel-board, and leant over confidentially towards me. "I have *created* birds," he said in a low voice. "New birds. Improvements. Like no birds that were ever seen before."

He resumed his attitude during an impressive silence.

"Enrich the universe; *rath-er*. Some of the birds I made were new kinds of humming-birds, and very beautiful little things, but some of them were simply rum. The rummest, I think, was the *Anomalopteryx Je-juna Jejunus-a-um*—empty—so called because there was really nothing in it; a thoroughly empty bird—except for stuffing. Old Javvers has the thing now. And I suppose he is almost as proud of it as I am. It is a masterpiece Bellows. It has all the silly clumsiness of your pelican, all the solemn want of dignity of your parrot, all the gaunt ungainliness of a flamingo, with all the extravagant chromatic conflict of a mandarin duck. Such a bird. I made it out of the skeletons of a stork and a toucan and a job lot of feathers. Taxidermy of that kind is just pure joy, Bellows, to a real artist in the art.

"How did I come to make it? Simple enough, as all great inventions are. One of those young genii who write us Science Notes in the papers got hold of a German pamphlet about the birds of New Zealand, and translated some of it by means of a dictionary and his mother-wit—he must have been one of a large family with a small mother—and he got mixed between the living apteryx and the extinct anomalopteryx talked about a

bird five feet high, living in the jungles of the North Island, rare, shy specimens difficult to obtain, and so on. Javvers, who, even for a collector, is a miraculously ignorant man, read these paragraphs, and swore he would have the thing at any price. Raided the dealers with inquiries. It shows what a man can do by persistence—will-power. Here is a bird-collector swearing he would have a specimen of a bird that did not exist, that never had existed, and which, for very shame of its own profane ungainlessness, probably would not exist now if it could help itself. And he got it. *"I've got it."*

"Have some more whiskey, Bellows?" said the taxidermist, rousing himself from a transient contemplation of the mysteries of will-power and the collecting turn of mind. And, replenished, he proceeded to tell me of how he concocted a most attractive mermaid, and how an itinerant preacher, who could not get an audience because of it, smashed it because it was idolatry, or worse, at Burslem Wakes. But as the conversation of all the parties to this transaction creator, would-be preserver, and destroyer, was uniformly unfit for publication, this cheerful incident must still remain unprinted.

The reader unacquainted with the dark ways of the collector may perhaps be inclined to doubt my taxidermist, but so far as great auk's eggs, and the bogus stuffed birds are concerned, I find that he has the confirmation of distinguished ornithological writers. And the note about the New Zealand bird certainly appeared in a morning paper of unblemished reputation. Evidently there are more things in heaven

and earth, and more particularly in private museums, than are dreamt of in our philosophies.—*Pall Mall Budget.*

Canada Otter.

Lutra hudsonica (*Lacep.*)

Habitat: Pretty generally distributed over North America; in Maryland being found most abundantly along the river courses on the "Eastern Shore."

The Otter was at one time very common in this state, but it has been so extensively trapped for its pelt worth from \$6 to \$8, that it is fast being exterminated, although still found sparingly on most of our rivers.

Their principal food consists of fish and crawfish, and if one or more take up their abode near a fish pond they will soon deplete it. It is said they will, at times, visit the poultry yards and the remains of wild fowl have been found in their nests. These nests are usually placed in a cavity, under the roots of a tree, along the river bank, and Audubon mentions having found them in a hollow tree. In the early spring, about April, they have their one litter, usually consisting of two young. These follow their mother for some time.

The Otter is said to be very playful and their favorite sport is sliding. For this purpose they select a high muddy bank, or in winter one covered with snow. In speaking of this habit Audubon says: "On one occasion we were resting ourselves on the bank of Canoe Creek, a small stream near Henderson, which empties into the Ohio, when a pair of Otters made their appearance, and not observing our proximity, began to enjoy their

sliding pastime. They glided down the soap-like muddy surface of the slide with the rapidity of an arrow from a bow, and we counted each one making twenty-two slides before we disturbed their sportive occupation." (Quadrepeds of North America, Vol. II, p. 8.)

They are generally captured by placing a steel trap, fastened to a chain, in the water at the bottom of one of their slides. In this case no bait is used, and the trap is so arranged as to drag them off in deep water and drown them. At other times it is set on the bank in a path, either being covered with a thin layer of snow or of earth. Like many other wild animals when caught in a trap, they will frequently gnaw off a foot or leg and escape.

They are a shy animal, seldom being seen. A man of my acquaintance, who follows fishing and trapping for a living, tells me that although he has trapped about forty Otters in the last twenty years, still in the same length of time he has only seen three loose.

He says they are very destructive to his nets, taking out fish, and at times tearing the nets.

Frequently when caught in a tight place they will fight desperately. Some years ago I saw one swim to the bank near where I was seated in a ducking blind, but out of gun shot. After remaining on the bank for awhile it plunged into the water and swam off. A day or two later, near the same place, two men were crossing the river in a small skiff, and seeing an Otter swimming ahead of them they went after it, and upon coming up with it they struck it with a paddle, the only weapon they had. In-

stead of diving and trying to escape, it turned upon them and tried to climb into the skiff, nearly swamping it, and it was only after a desperate fight that they succeeded in killing it.

In conclusion I will say I do not think the Otter is quite as rare as it is generally supposed to be. I have notes on five killed within fifteen miles of Baltimore in the last twelve months, and have heard of several others being seen, I myself, having noted their footprints in our marshes on one or two occasions.

I hope that through the channel of the MUSEUM we may see other notes on mammals, the publications open to such, being very few.

WM. H. FISHER,
Baltimore, Md.

Breeding of "Sturna" upon Wee-pecketa Islands, Mass.

C. C. PURDUM.

Among the numerous islands located in the waters of Buzzard Bay and Vineyard Sound, is the interesting group known as "The Weepecketa" The name is doubtless of Indian origin, although the exact derivation and meaning of the term can not be positively determined. These islands, three in number, are situated in a chain running in a generally northern and southern direction.

The structure of these islands is interesting although characteristic of the coast in this locality. The base is particularly rocky; rising abruptly from the water's edge. Above this, on the outer of three islands, is a short expanse of the clear sandy soil common to this locality; this in turn is surmounted by an abrupt rise of clay like

soil, topped by a thick layer of clear loam upon which the coarse grass and weeds of the sea shore grow abundantly. The southern or larger of the three islands presents some slight difference in structure; being surrounded at its foot, above the rocky base, by a wide belt of fine gravel mixed with numerous shells and here and there a stray arrow head or spear point may be found buried beneath the layer of gravel. The top of the island is abundantly covered by thick grass and a few weeds. However, it is not the geographical peculiarities which are of particular interest, but from the fact that these islands serve as the breeding locality for countless numbers of the Common, Arctic and Roseate Terns. When approaching the islands upon a clear sunny day in June; they stand out in bold relief against the sky; hardly a "breath of air" is stirring. The lazy "flap" of an occasional Jaeger or the delicate movements of a dainty Petrel, are all that can be noticed. As you approach the islands a few Terns may be seen hovering above the summits. Your boat keel grates upon the shore, you step upon the rocks and—Presto! What a change. Suddenly above your head, it seems as if a perfect pandemonium had suddenly been set in motion. Circling above your head are countless numbers of the beautiful Terns with their snapping bills and angry cries making a din all but indescribable. You raise your gun and pull the trigger and a beautiful "Roseate" falls into the water. Now an interesting thing happens. The whole vast number of birds which only a short time before showed such pugnacious manifestations suddenly become transformed into sympathizing,

affectionate brothers, sweeping low over their wounded brother with sharp, passionate cries which together with the ineffectual attempts of the wounded bird to join them makes a touching picture. But the nests. That of each species does not differ in any essential particular from the other. They are all simply hollowed out for the depth of about an inch, and perhaps lined with a slight amount of sea weed, but more frequently possessing no lining whatever. Some little attempt at colonization is made, although no hard and fast line can be drawn. The Roseates (*Sterna dougalli*) chiefly nest upon the top of the two outer islands and may make some slight attempt at concealment, under some friendly bush. The Common variety (*Sterna hirundula*) and the Arctic (*Sterna paradisea*) may be found nesting together at the base of both islands and to a small extent upon the northern end of the southern island. A remarkable fact, is that upon this, the southern, only a few nests can be found each year. This however has not always been the case. At one time the three varieties reared their young in great profusion upon this island, but for several consecutive years the grass and bushes upon it were entirely destroyed by fire, thus breaking up the breeding.

The eggs vary greatly in size, shape, color and markings and are too well known to need description. But one word must be said upon the production of this great difference. For instance in one nest we find three eggs (the usual number) which presents entirely different markings. Why is this? Of course the theory has been advanced that each bird may lay a differently

marked egg and that the various eggs are laid by different birds. I, myself, was inclined to take that view until last season when I instituted some experiments to prove it, and found the results decidedly negative. On several occasions I shot the female as she was rising from the nest and in each case no eggs were deposited subsequently. Some observers have however (and their veracity can not be questioned) found that after removing a set of three eggs from a certain nest, and returning the next day that another full set of three had been deposited. Of course no one bird could be responsible for this and although I have never been able to verify this by personal experiments, I must give the view a consideration and leave the question as to the "parentage" of the eggs still *sub judice*.

At some future date however I hope to institute some more conclusive experiments and to establish the fact, either affirmatively or negatively.

Red-shouldered Hawk.

April 24, 1892. The day opened clear and bright after the several days of rainy weather we had just experienced and knowing that it would be a good day for the birds I took a small lunch and a large collecting box and started for a wild, low-lying piece of woodland, a few miles from my home, that is known by the name of "Cedar Swamp."

And it is a swamp. Everywhere it is covered by a thick growth of small cedar and hemlock, about twelve feet in height. Near one end is the "Island" covered with larger hemlocks. "Bearded with moss and in gar-

ments green" that go towering up towards the clouds.

Distant from this about three hundred yards in a northerly direction are several acres of large pines which were formerly the breeding place of Big Blue Herons but which for some reason they have deserted.

Here and there among the thrifty pines are rotten stubs from twenty to thirty feet in height, remains of some ancient forest monarch long since conquered by time.

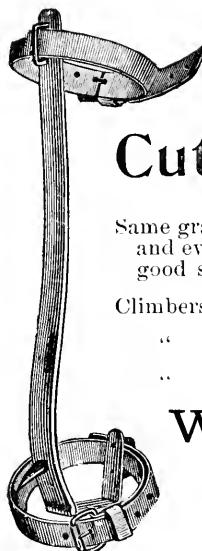
It was here that I once saw a Pileated Woodpecker and followed him all day in the hope of securing a set of eggs, and at last, just at dusk, found myself in the farther end of the swamp, which was too far from home to return that night, but for the fact that I had to leave on the midnight train.

But I am wandering. As I said it was a remarkably pleasant day and I was soon within the woods lost to all thoughts but those relating to Nature.

The trees were alive with birds. On every stub Downy Woodpeckers and Chickadees are to be seen, while near by would be found "Downy's" larger relative, the Flicker.

Occasionally I would come across a pair of Bluebirds or a bunch of Robins cooing love notes to each other. And now nearing the border of an open field I hear the pure, clear notes of the Meadowlark and the echoing answer—the low soft whistle of the Wood Pewee.

As I approached the larger woods I noticed two large Hawks circling overhead. I immediately turned my glasses on them but could not identify them because of the distance. I pro-



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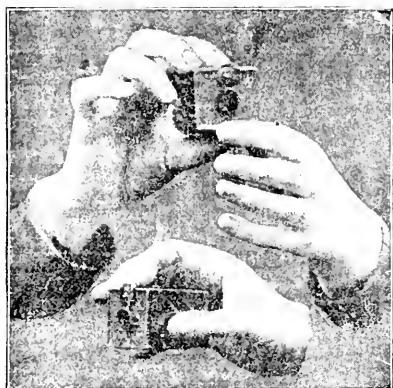
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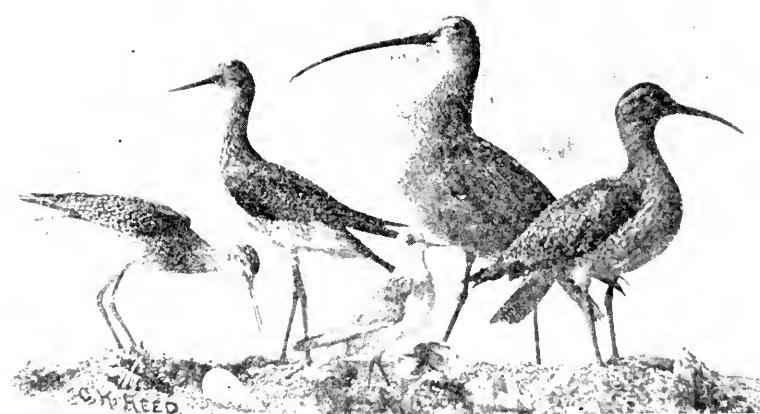
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A Monthly Magazine Devoted to Research in Natural Science.

VOL. I.

ALBION, N. Y., MAY 15, 1895.

No. 7

James D. Dana.

In the death of Professor James Dwight Dana, America has lost one of her greatest scientific men. The celebrated mineralogist and geologist passed away after an illness of only a few hours at his New Haven home on Easter Sunday, April 14, in the eighty-second year of his age.

He was born in Utica, February 12, 1813. His early education was obtained at school in his native place. In the autumn of 1830 he entered Yale College and graduated three years later, after which he was appointed professor of mathematics to midshipmen in the United States Navy. In the two years he held this position he visited France, Italy, Greece and Turkey. In 1835 he returned to New Haven and became assistant in chemistry to Prof. Silliman. He was engaged at this time in the preparation of his "Treatise on Mineralogy," the first edition of which was published in 1837. This work was the first of his remarkable writings which were to mark an epoch in the history of natural science. In 1836 he received the appointment of mineralogist and geologist to the exploring expeditions sent by the United States to the Southern and Pacific Oceans. The Peacock, on which he sailed, was wrecked at the mouth of the Columbia River. In the three years and ten months which he spent on the trip he visited Maderia, Rio de Janeiro, Terra del Fuego, Valparaiso, Callao, Tahiti, Samoa, Aus-

tralia, the Hawaiian Islands, the Feejee group, Manilla, Borneo, Singapore, Cape of Good Hope, St. Helena and many other places. Besides the mineralogy and geology of the expedition, Mr. Dana had under his supervision the zoological department, including the crustacea and corals. The rare opportunity which this voyage afforded for scientific observation had been well improved, and for thirteen years after his return he was engaged principally in studying the material that he collected, making drawings and preparing reports for publication.

From 1842 to 1844 he lived in Washington. In the latter year he removed to New Haven, where he married Henrietta Francis, third daughter of Prof. Silliman.

In 1850 Mr. Dana was appointed Silliman professor of natural history and geology in Yale College, succeeding his father-in-law, but he did not enter on the active administration of the chair until 1856. The title of the professorship was changed in 1864. Mr. Dana became associate editor of the American Journal of Science and Arts, and after Professor Silliman's death, its senior editor. Contemporaneously with his duties as a lecturer and editor, Professor Dana prepared his well known book on mineralogy and geology. His "System of Mineralogy" grew in size from 452 pages in 1837 to the edition of 1892, which contains 1,197 pages. The "Manual of Mineralogy" a more ele-



James D. Dana

mentary work, has also a deserved popularity. These books, with his "Manual of Geology" and "Text Book of Geology," are recognized as standard throughout the world, and are used as text books and works of reference wherever the science of which they treat are taught in the English language. His writings on the coral islands include "Coral Reefs and Islands" (1853) and a second edition of that book which was published in 1872 under the title of "Coral Reefs and Islands." His separate papers include hundreds of titles. Many honors were paid to Mr. Dana.

He received the degrees of Ph. D. and L. L. D. The Geographical Society of London conferred on him its Wollaston medal in 1872, and in 1877 he received the Copley gold medal from the Royal Society of London. He was also a member of the chief scientific societies of America and Europe. Prof. Dana retired from active work at Yale two years ago, but has given private lectures and instructions at his home and gave invaluable advice on the subject of geological and zoological matters in the Peabody Museum.—*Scientific American.*

Taking of the Eggs of the Golden Eagle.

Being anxious to secure a set of eggs of the Golden Eagle for an Eastern friend who greatly desired them, I started on the 23d of last month, with horse and light "buckboard" for a drive of 16 miles, to a canon near the head of the Gunnison river, where for the past 15 years I had noticed a pair of these Eagles had nested in the same place—a ledge on the face

of the cliff, about 200 feet high—the nest being two-thirds of the way up.

I took my granddaughter along with me, she being as interested in all such things as myself—and I may as well mention right here and be done with it that I am a woman 64 years "young" as Dr. Holmes once said of Julia Ward Howe—and enjoy outdoor pursuits to the full extent of my strength. We reached the Canon at noon, fed the horse, luncheoned ourselves, then climbing the opposite hill, we, with the aid of a field glass, found that the nest was in good repair, and the old folks at home even though there was still considerable snow in the gulches all around. We at once started back to town intending to find a man with whom we had made arrangements to scale the cliff for us, supposing we found the nest occupied. We saw him and agreed to meet in the Canon at 10 a. m. the next day and did so. Then we took time to discuss the situation, as seated on the bank, close to the rushing, foaming, beautiful river, we cast dubious glances at the cliff, which I must confess wore a very forbidding aspect, to anything less than a bird or an angel, neither of which we happened to be. However we were there on business bent and we determined to do and dare—that is we two would do the looking on and the man would do the 'dare' part of it—so with a caution from us not to fall, or if he did, not to break the eggs, he started for the cliff. He attempted to climb straight up, but finding that impossible he went quite a distance beyond and began the ascent in a zig-zag course along the face of the cliff, each step taking him a little nearer the object in view. It

seemed to us that he could never succeed—sometimes he would suddenly disappear, which had a startling effect until we found it was when he passed behind a point that jutted out from the main cliff, far enough to allow him to do so, although from that height it appeared a perfectly smooth surface, and we gave a sigh of relief as we finally saw him rise head and shoulders above the edge of the nest, where he appeared to us about as big as a woodchuck.

Ordinarily, the better course would have been to lower himself from the top by means of a rope but this cliff projected at such an angle from above that he would have swung too far out to reach the nest. He was a longer time getting down than up, though greatly assisted by means of a short rope, which he doubled and putting the loop over a projection, could with a firm grasp of the rope reach a resting place for his feet, which otherwise would be perhaps a few inches beyond his reach; then drawing the rope to him by one strand and doubling it again it was ready for the next difficulty.

At last he reached the ground and we ran to meet him, but found to our great disappointment that he had but one egg. It seems that he had put the first egg safely into the box slung around his neck and had taken the other in his hand, when his foot slipped and he instinctively grasped at the ledge to save himself and crushed the egg. Well, a spilled egg is as bad as spilled milk and no use crying over either; besides we were comforted by knowing the poor fellow felt as badly as we did so we paid him for his efforts and sent him home.

Then, having our implements along, we proceeded to empty that egg right then and there—having the whole river for a water supply—and we had no trouble, it being but four or five days incubated.

It is a fine specimen and my grandchild is delighted to add it to her modest collection of "singles," though we would gladly have sent them to our friend, had we secured the two. And now we are looking forward to some fine outing trips, when in a few weeks we intend to do some big mountain climbing in search of the eggs of Dusky Grouse, Gray Ruffed Grouse, and at lesser altitude, the Sage Hen and smaller mountain birds of this locality.

MRS. A. H. GLEASON,
Gunnison, Colo.

An Ancient Lake in Central Vermont.

BY C. O. ORMSBEE.

(*Continued from April number.*)

Five miles from Montpelier, in the angle formed by the junction of Batchelder's Brook with Worcester Branch is another deposit of silt exactly similar in general appearance and situated at the same level as the one just described. The appearance of the sides of these deposits is such as to give rise to the impression, that, during the existence of the lake and while these deposits were being formed, the prevailing winds were from the northwest. Another indication of the existence of the lake is to be seen near the village of Wrightsville, where the waters beat against an almost perpendicular ledge and left well-defined wave-lines.

From the data already established

it will be easy to ascertain, by a series of levelings, the exact extent and dimensions of the lake which was beautiful in the extreme. In shape it resembled a five-pointed star, with its nucleus near where Montpelier is now located and its points or arms reaching in each direction. One extended westerly to Middlesex, another northerly to Worcester, a third东北erly towards the headwaters of the Winooski as far as Plainfield, a fourth in the valley of Steven's Branch south-easterly a little beyond Barre, and fifth southerly in the valley of Dog River nearly to Northfield. Nestled so among the mountains, it may be assumed, that no Swiss lake ever surpassed it in picturesque beauty.

It now becomes important to enquire into the history of the lake; to ascertain the nature and origin of the barrier which caused it; and to investigate the causes which led to the demolition of the barrier and the consequent drainage of the lake. The topography of the surrounding country is such that the barrier must have been located at, or very near the chasm. No other location is possible. Now a few rods east of Middlesex village, and following the course of a valley which lies at the foot of, and parallel with, the mountains, or rather which lies between the mountains, and a range of high hills but a short distance to the east is a small stream, locally known as Great Brook. About a mile from the village this brook is joined by McElroy's Brook at such an angle, and under such topographical circumstances, as to produce a most excellent location for a deposit of silt. But no such deposit is to be found. Instead, is a medial moraine, and on

each side of the valley are to be found traces of a lateral moraine. The conclusion that a glacier once pushed its way down the valley cannot be resisted.

Now the angle of union between the valley of this brook and the river valley is too great to be easily turned by a glacier. Instead, the glacier would push its way directly across the valley, which by the way was then, no doubt, occupied by the lake at its lower level, and infringe against the almost perpendicular face of the mountain on the opposite side, which might possibly deflect it slightly down the stream. Thus the glacier would fill the chasm and rest upon the ledge through which the channel has been cut. A barrier would now be formed, and if the pressure from above were sufficient to prevent the water from flowing under and raising it, the result would necessarily be the formation of the lake. We believe this to have been the case and that the lake was caused by an ice-gorge which filled the chasm through which the river flowed. Were it necessary several instances of other lakes having been similarly formed might be cited in corroboration.

Once formed, the lake would continue in existence as long as the barrier remained intact, and if the onward movement of the glacier was sufficient to compensate for the action of the waters of the lake upon the ice which formed the barrier, the lake would remain indefinitely. We believe this to have been the case and that the lake remained perhaps for centuries.

From further observations it seems evident that at length the water found

an opening under the ice, and through this opening the lake was drained; the onward motion of the glacier compensating for its loss by erosion, and its weight combined with the enormous pressure of the waters of the lake caused the soft rock beneath to be rapidly cut away, thus simultaneously drained both lakes. This conclusion is strengthened by the fact, that at numerous points in its course the river flows over ledges of rock, similar in composition and that in no other place has erosion caused any noticeable result. Moreover it seems to be the most reasonable explanation of the origin and disappearance of the lake, and until a better one is given we shall regard it as substantially correct.

The American Flamingo.

BY ADOLPHE B. COVERT.

Flamingoes. Scarlet Flamingoes, strange, beautiful, weird birds. They are indeed one of the oddities of nature's handiwork. I shall never forget my first meeting with these singular and graceful creatures. I came upon them all unexpected; it was upon the west coast of Florida. We had been drifting and cruising about in an aimless kind of way for some days; the weather was simply glorious, in fact too much so and to judge from myself our little party of natural history tramps were becoming exceedingly lazy, and a feeling had apparently come over us of not caring what we did or where we went. For some days the time had been spent in idle dreaming, smoking, reading or lolling in our hammocks. Our yacht lay snugly at anchor in a little land-

locked bay, the stately and beautiful forest trees extended nearly to the water's edge; the sky was all blue with scarcely a cloud to be seen; gentle land breezes wafted the sweet scent of flowers to us, the hum of the myriad insects of the woods floated by; all nature seemed to be at peace. The nearby shore, with its dark green forests draped in long gray moss, looked very inviting, but the "Imps of Indolence" had riveted fast their fetters and held us closely to the decks of the yacht. However the experience of other days had taught me that this could not continue long without breeding ill-feeling between the members of our little party.

So one afternoon I resolved to break the fetters and go ashore; three o'clock found me traversing the shore line, all by myself, intent on nothing. Thoughts of Michigan and its forests of pine, of home, of wife and babies, of my canine pets, and my meek-eyed Jerseys, had come over me with these pleasant day-dreams. I had gone perhaps three miles when I concluded to stretch my legs with a short tramp. I had beat inland for a little way and then returned to the water's edge when, how it happened I cannot tell, but there he stood; a beautiful flame-colored bird, a Scarlet Flamingo, not four rods from me.

Did I shoot? Well I should say no; who thought anything about shooting? I did not know that I had a gun. I just stood still and looked and looked again, and considered how I should mount that bird; and he, all unconscious of my presence, idly preened his beautiful plumage. Every movement was an embodiment of grace



and beauty; now and then he raised his ample wing, showing the jetty black of the primaries and the intense crimson hue of the auxillary feathers

How long this would have lasted I can not say, but an awkward move on my part, and with a flash and whirr he was up and off, a flaming meteor against a blue background. He was followed by a second, a third, a fourth and I do not know how many

more; I silently gazed with staring eyes at the long line of scudding scarlet and rushing crimson until they faded from sight in the far distance.

No, I did not even remember that I possessed a gun; oh no, I did not mount that bird; in fact I never killed a Flamingo, but I have mounted quite a number and that afternoon's lesson was of great value to me.

The publisher of the MUSEUM sent me, a few years ago, a remarkably fine specimen, a photograph of which forms the illustration which accompanies this article.

How it happened that I approached these birds so closely I could never comprehend, but this sometimes does occur. Only last spring I found myself within five rods of a flock of Great Blue Herons and killed a fine male with an ounce of number eight shot in a sixteen gauge Parker gun.

But to return to the Flamingo. Of its home life little is known, the majority of observers not having improved their opportunities, or having simply seen the bird at a distance.

My old-time friend, that noted Florida collector, Chas. J. Maynard, could tell more of the breeding habits of the Flamingo than any living collector and I regard his description of their nest and eggs as being the most accurate of any I have ever read.

His description of the nest is as follows: "A heap of rubbish, such as decaying vegetables, mud, etc., heaped up from twelve to eighteen inches; it is from three to four feet in diameter at the base and about two feet across at the top, with a slight hollow to receive the eggs which are two in number, oval in form, bluish in color, covered with a white calcareous de-

posit and from 2.00 to 2.25 x 3.10 to 3.50 inches in dimensions."

The illustrations we see in various books, of a nest as if built by a mason with a gradual, systematic taper from bottom to top and from three to four feet high, with the bird astride with dangling legs is too absurd a caricature for me to indulge in.

Sir Henry Blake describes the nest as being built on mud and about eight inches in length and the bird sitting on their nest with their long red legs doubled under them.

Mr. Maynard also tells us (naturalists in Florida) of a breeding place in the Bahamas where among hundreds of setting birds not one had their legs hanging down.

But, be that as it may, I never met the Flamingo again, except in Zoological gardens, where the birds have always seemed heart-broken and despondent. I do not like caged birds anyway and perhaps they were happy and contented and it was only my imagination that caused them to appear so to me.

Further Notes on the Nesting Habits of the American Flamingo.

BY ABEL CHAPMAN IN THE IBIS.

The following notes on the Flamingo were taken in the vicinity of Andalucia, Southern Spain, as the writer spent two springs on which province, from its geographical position to Europe and Asia, as well as from richness and great variety of its natural features is probably unsurpassed, as regards Avifauna, by any other similar extent of ground in Europe.

"To return to the Flamingoes: On examining nearly all the different

herds there was an obvious dissimilarity in the appearance of the different groups; one or two in particular seemed so much denser than others; each narrow white line appeared at least three times as thick, and in the center looked as if the birds were literally packed upon each other. Felipe suggested that these birds must be at their "pajarera" or breeding place: and after a long ride through rather deep water we found that this was so. On our approach, the peculiar appearance of the herd from a distance, became clearly discernable; many of the birds were reaching down on a low mud island; some were standing on it, and others again were in the water; thus the different elevations of their bodies formed what had appeared a triple or quadruple line."

"On reaching the spot we found a perfect mass of nests; the low mud plateau was crowded with them as thickly as the space permitted; these nests had little or no height; some were raised two or three inches, a few might be five or six inches: but the majority were merely circular bulwarks of mud with the impression of the bird's leg marked distinctly on it. The general aspect of the plateau was not unlike a large table covered with plates. In the center was a deep hole of muddy water which from the gougéd appearance of its sides appeared to be used as a reservoir for nest-making materials."

"Scattered all around this main colony were numerous single nests rising out of the water, and evidently piled up from the bottom. Here and there two or three or more of these were joined together and "semi-detached" so to speak; these separate nests rose

some six or eight inches above the water level and were about 15 inches across; the water was about 12 or 15 inches deep. None of these nests as yet contained eggs; and although I returned to the "pajarera" on the latest day I was in this neighborhood (May 11) they still remained empty. On both occasions many Flamingoes were sitting on the nests, and on the 11th we had a good view of them at close quarters. Linked arm and arm with Felipe, and crouched low on the water to look as little human as possible, we crept within some 70 yards before their sentries showed signs of alarm, and at that distance with the glass, observed the setting birds as distinctly as we need wish. Their long red legs doubled under their bodies, the knees projecting as far as, or beyond the tail, and their graceful necks neatly curled away among their black feathers like a setting swan, with their heads resting on their breasts, and all these points were unmistakable. Indeed it is hardly necessary to point out that in the great majority of cases (the nests being hardly raised above the level of the flat mud) no other position was possible."

"Still none of the crowded nests contained a single egg. How strange it is that the Flamingo, a bird that never seems happy unless up to its knees in the water should so long delay the period of incubation; for before eggs could be hatched in these nests and young reared, the water would have entirely disappeared, and the Flamingoes would be left stranded in the midst of the scorching plain of sun-baked mud. Being unable to return to the marisma I sent Felipe back there on the 26th of May, when he ob-

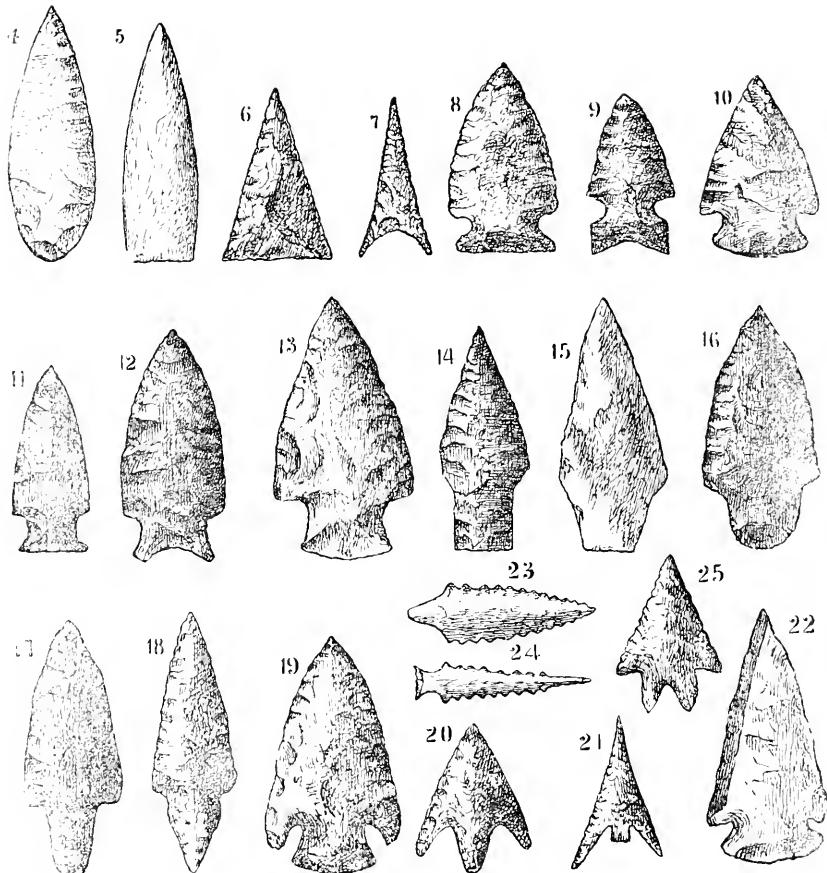
tained the eggs. In 1872 I obtained eggs taken on the 24th of May. One of my specimens is extremely rugose."

Asphaltum and the Pitch Lake of Trinidad.

Although asphaltum, or mixed pitch, is not, like the closely related mineral coal, one of the great agents of modern civilization, its uses in the arts are varied and important. The popular knowledge of its nature and origin, however, is limited and imperfect. Asphaltum is one of many native bitumens; and among these bodies we observe a graduation from the solid asphalum, through intermediate forms, known as mineral tar, to liquid petroleum and limpid naphtha. It has been definitely settled, that, in their origins, the bitumens are organic, being transformed tissues of plants and animals.

Chemically considered, the bitumens, like the coals, are hydrocarbons, but differ in containing little or no oxygen, and a much larger proportion of hydrogen. The influence of this extremely fluid element is very evident; for, while the coals agree in being infusible and insoluble, the bitumens are either naturally liquid, or become liquid when heated, are soluble in benzole, ether, etc.

Modern investigations, however, have made it certain, that, in their origin, the bitumens are more varied than the coals. Coal is due to the accumulation of half decayed land plants in the waters of swamps and marshes; but geologists are now well agreed that the lighter and more fluid bitumens, like petroleum are mainly marine, being derived partly from sea-

ARROW-HEADS ($\frac{1}{2}$)

weeds, but chiefly from marine animals, such as corals, and mollusks. It is well known that petroleum gives off gas freely, especially when heated; and this is the source of the natural gas now being obtained from the oil fields of Pennsylvania and Ohio. When the conditions are favorable for the escape of this gas its evolution continues, and the petroleum becomes less and less liquid, and finally changes to asphaltum.

Where this drying up of the petroleum has taken place in fissures, or cavities in the earth's crust, asphaltic deposits of great purity and value have

been formed. The brilliant and almost jet-like albertite in Hillsboro, New Brunswick, which was mined for many years and used for the manufacture of gas, is a variety of asphaltum having this origin. The grahamite of West Virginia is a substance closely resembling albertite, and occurs in a similar fissure or crevice. It is quite certain, however, that the typical asphaltum, which is used so extensively for paving, roofing, and like purpose, has not been formed chiefly in this way. It is not of marine or animal origin, for the evidence is very conclusive that, like the coals,

it is the product of land vegetation. Indeed, under the proper conditions, it would have become coal itself. The most important of these conditions is, perhaps, temperature; for it is a curious fact that asphaltum is found chiefly in warm countries, while coal occurs in colder latitudes.

Coal and petroleum are so widespread and abundant in our own country, that the general conditions under which they occur, and the usual modes of obtaining them, are familiar to every American student of geology; but no adequate account of the great tropical deposits of asphaltum can be found even in the best general works on geology; and the special object of this article is to supply this deficiency by a somewhat detailed description of a typical example.

Trinidad is a rectangular island, with an area of about 2,000 square miles, separated from the eastern angle of Venezuela and the delta of the Orinoco by the gulf of Paria, and bounded along the north side by a bold range of mountains, which stand like a wall between the lowlands on the south, and the Caribbean Sea, and a long chain of volcanic islands on the north.

Asphaltum usually accompanied by mineral tar and petroleum, occurs at many points on Trinidad, and also on the adjacent main. The largest and most interesting deposit, not only of this region, but of the world, is that known as the Pitch Lake. This is on Point La Brea (Spanish for "the pitch"), in the southwestern parts of the island, and one mile from the Gulf of Paria.

The topography of the country about the lake is extremely simple. From

three sides, north, west and south, the land slopes gradually upward from the sea to the surface of the lake which lies one hundred and forty feet above the gulf; while on the east the land is slightly higher than the lake, which therefore differs from ordinary lakes, in resting, not in a valley, but on a hill-top. In fact, its appearance is as if the broad-mouthed crater of a low-lying volcano were overflowing with sluggish streams of black lava slowly creeping down toward the sea. These slowly moving masses present curved lines and convex surfaces; and Canon Kingsley has very aptly likened them to glaciers, the lake representing a *mer de glace*.

The asphalt becomes harder the longer it is exposed to the air and sun, and consequently the downward progress of the "black glaciers" must constantly be checked, if not at last entirely stopped. It seems impossible to determine the extent of the overflow; for although the entire slope from the lake to the sea appears as a continuous sheet of pitch, yet it is probable that most of this has exuded from the asphaltic sandstone beneath it. The area covered or underlaid by this mantle of pitch is estimated at 3,000 acres.

The bitumen is not injurious to plant life, for the scanty soil covering the pitch, and consisting largely of that material in a pulverulent state, supports a luxuriant vegetation.

The village of La Brea, on the shore, rests on the pitch; and the inhabitants complain that their houses are thrown out of level by the rising and sinking of their tarry foundations. It seems as if everything here—vege-

tation, houses, roads, etc.,—were slowly drifting towards the sea.

"It is fortunate," as one writer has remarked "that the pitch, when compact, will not kindle, or, in other words, will not burn without a wick; for otherwise the entire region, including the village might suffer the fate of 'Sodom and Gomorrah.'"

The pitch not only forms the sea-shore for nearly four miles, but in front of the village, and perhaps 100 miles from the shore, it rises from the sea as a solid barrier-reef, which is often a source of danger to unwary boatmen. It is possible that the peninsula of La Brea owes its existence to the protection afforded the land by this reef of asphalt, which resists the action of the water better than the unconsolidated clays and sands forming the coast to the north and south.

We may now return to the lake. Of the published descriptions of this remarkable phenomenon, very few are accurate. Probably no object in nature has been so grossly misrepresented as the Pitch Lake of Trinidad. In an official history of the English Exposition of 1851, it is stated that "the Pitch Lake is on the highest land on the island. It is soft and fluid at the center, and there is an active submarine volcano near the coast."

Another writer speaks of "a submarine volcano, which at times makes a noise like thunder, and emits naptha and petroleum." I have already given the true altitude of the lake, as 140 feet, while the highest point on the island is Mount Tucutche, 3,100 feet above the sea. The "submarine volcano" is a petroleum spring which comes up under the water a short distance from the shore; the water is vis-

ibly oily over an area of several rods, and bubbles of gas are sometimes seen to escape, but nothing further. The lake is usually described as "three miles in circumference, hot and fluid in the center, but cold and solid towards the shore."

In point of fact, this body of pitch, which is of approximately circular outline, is scarcely one and one-half miles in circumference, and there is no part of its surface that may not be walked upon with impunity. The temperature is uniform throughout. Its surface, soft enough in a few spots to receive a man's boot, is for the most part quite hard and firm, and everywhere of a dull earthy-brown or brownish-black color. The fracture of the pitch is eminently conchoidal, but the luster is always dull; the result of an admixture of 20 to 30 per cent of earthy matter, sand and clay. These impurities are removed by boiling, and the pitch then becomes shining black and more brittle.

There are some twenty or more patches on the lake, five to fifteen yards in diameter, where soil has collected, and vegetation, trees, shrubs and grasses has gained a foothold, forming green islands or oases. The surface presents many small, dome-shaped swellings from an inch to a foot in diameter. These pitch bubbles are always hollow, and contain traces of decayed vegetation. Excavations made in the pitch show that below the surface these cavities or vehicles are exceedingly numerous. They are usually almond-shaped, and though always the result of gaseous expansion, are commonly filled with water. In fact, the entire mass of pitch is saturated with water so that

even where quite soft, it will not soil the hands, because the water oozes out and prevents adhesion.

The pitch is quarried by excavating areas 30 or 40 feet square to a depth of two to four feet. As soon as the work ceases on one of these excavations, the asphalt begins to obliterate it, the walls not closing in perceptibly, but the bottom rising up, and in a few days no trace of the opening remains. This is one of the many indications of greater fluidity below the surface.

Toward the center of the lake are several detached areas, a rod or two in breadth, which are softer than the rest of the surface, and yield under the feet, "so that, on standing a few minutes, one feels that he is gradually settling down, and in the course of ten or fifteen minutes, he may find himself ankle deep." "But," as Mr. Manross truly says, "in no place is it possible to form those bowl-like depressions around the observer described by former travelers." Nor is it probable that Kingsley is right in saying, "No doubt there are spots where, if a man staid long enough, he would be slowly and horribly engulfed." The inferior density of the human body would prevent its submergence, even if the pitch were quite fluid.

In the vicinity of these places many small streams of gas escape from the pitch. The evil smell, and the deposit of sulphur left of the pitch, tell us that the gas is chiefly sulphuretted hydrogen; but the sulphurous odor ceases to be perceptible at a distance of a few rods, and does not extend for ten or twelve miles, as some writers have asserted.

The surface of the lake does not

present a continuous sheet of asphalt, but it is traversed by a net work of channels in which the rain water collects. These unite and divide most curiously, forming one connected system, and dividing the pitch into numerous flat-topped or slightly convex areas or islands, which are usually of quite irregular outline, though sometimes nearly circular, and from 10 to 100 feet in diameter. A piece of marbled paper would give an excellent idea of the appearance of the lake. The sides of these channels are convex, presenting curves of great regularity and beauty; and, where three or four channels meet, a star-shaped depression is formed.

Several explanations of this peculiar structure of the lake have been proposed. Each of the many hundred areas in which the lake is divided possesses an independent revolving motion, in this wise: In the center of the area the pitch is constantly rising up en masse displacing that which previously occupied the center, and forcing it towards the circumference. Where the edge of such an expanding area meets that of the adjoining one, the pitch rolls under, to be thrown up again in the centre at some future period.

We find unique and conclusive evidence of this revolving process in "numerous pieces of wood, which being involved in the pitch, are constantly coming to the surface. These fragments of wood are of the same recent origin as the leaves and twigs contained in the vehicles of the pitch. From the surrounding forests, or the green islands of the lake itself, they have found their way into the water-channels, become water-logged, sunk to the bottom, and been drawn up again by

the ever revolving pitch." The true cause of the revolving motion of the pitch, and of the structure resulting therefrom, is apparently the great diurnal range in the temperature of the surface of the lake. On unclouded days the asphalt attains a temperature of about 140 degrees F., and sinks during the night to 70 or 60 degrees suffering a variation of 70 to 80 degrees which must produce a considerable change of the volume. This expansion is superficial, and its chief tendency is to extend the pitch horizontally. Where the pitch is covered by water, it will not experience this alteration of volume; and these protected areas are forced downward by the expansion of the unprotected areas.

No soundings have ever been made in this lake, and its depth is unknown. The thickness of the deposit is, of course, a factor of the first importance in determining whether the supply of asphalt is likely to prove practically inexhaustible. In considering the question of the probable permanence of the supply, it is also important to remember that the material is doubtless escaping from the underlying asphaltic sandstone, though perhaps very slowly.

As regards its origin, the lake is believed not to differ essentially from any of the patches of pitch scattered over the surrounding country. It appears to be simply a large puddle of pitch, which has oozed out of the sandstone and collected in a basin-like depression in that rock. The observations of Mr. Wall have placed the vegetable origin of this bitumen beyond question. The asphaltic sandrock is rich in vegetable remains; and it is possible to trace every step in the conversation of these

into asphaltum, until the organic structure of the wood is entirely obliterated.

W. O. CROSBY, in Swiss Cross.

Fish Commission's Exhibit at Atlanta.

Among other attractive features of the exhibit of the United States Fish Commission at the Cotton States and International Exposition, the scientific investigations of the Commission will be illustrated by casts of fish and other animals from life, and by collections of sponges, oysters, and other shell fish, crabs, lobsters and shrimps, coral, sea lillies, sea pens and numerous other materials brought up in the dredging and trawling apparatus by the vessels of the Commission. The apparatus used in the collection of these objects will also be shown, as well as the complicated instruments accessory to the work of deep sea and inland investigation. In the division of methods and statistics of the fisheries, the relation of the Commission to the fisheries will be shown by means of types of vessels and other equipments employed, and by charts and tables showing the extent of the industry in the United States. The Commission has a great wealth of handsome pictures intended to beautify and round out its exhibit, and of these as many as the space will accommodate will be shown at Atlanta.—*Fishing Gazette*.

Gainesville, Florida, Jan. 7, '95
Mr. Walter F. Webb, Albion, N. Y.

My Dear Sir:—Your letter and pamphlets received today. I think it can be safely said that the MUSEUM has no equal. The cuts are beautiful and the reading is excellent. It is worth a great deal more than the price of subscription. I am dear sir,

Sincerely yours,
FREDERICK DAVIS.

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**Walter F. Webb, Editor and Pub'r,
Albion, N. Y.**

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**WALTER F. WEBB,
ALBION, ORLEANS CO., N. Y.**

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NOTES.

There are 30,000 species of recent and 7,439 species of fossil plants in the herbarium of the Smithsonian Institution at Washington, D. C.

In the museum at Christchurch, New Zealand there is a perfect skeleton of the Moa, a bird believed to have become extinct 2,000 years ago. It measures sixteen feet in height.

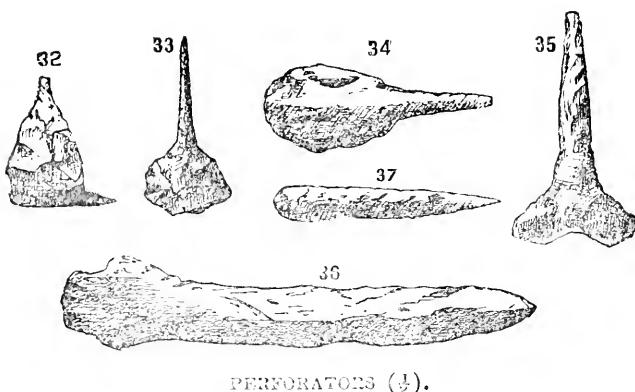
The museum of the State University of Missouri located at Columbia, Mo. contains departments of Mineralogy, Geology, Botany and Zoology. The buildings are 100x140 in size and are entirely fireproof, steam heated, electric lighted modern buildings. This is probably one of the finest museum buildings in this country.

Two Bonaparte Gulls were shot within the village of Albion during April and brought into our office to mount. One was in full plumage.

We have received the announcement of *The Naturalist and Collector*, a new Naturalist Magazine to be published by the Shoop Publishing Co. of Abingdon, Ill. It is to be a 32 page journal brim full of interesting reading matter and we predict for it a full measure of success.

We are very sorry that our brother editor of the *Nidiologist* has felt obliged to let himself loose further *in re* California Vulture. From the reports coming in during April and forepart of May, he may be called upon to produce some of his certified checks *before Fall*. We have a fine egg of the Jabiru, a specimen practically unknown in North American collections, which we are thinking of placing in his hands to *boom*.

3000 new species of wasps, beetles, spiders, dragonflies and other insects, a new species of Perepatus that supplies the missing link between the worm and centipedes and two Sierra Madre Peaks before unnamed form part of the results of the exploring expedition to Lower California and Mexico which was sent out by California Academy of Sciences in charge of Dr. Gustav Eisen and Prof. Frank Vaslit. There are over 40,000 natural history specimens stored in this academy and when arranged and classified this institution will have the largest collection of Lower California and Mexican natural history specimens in the world.

PERFORATORS ($\frac{1}{2}$).

The National Academy of Sciences.

The meeting of the National Academy of Sciences that was held in Washington recently was of more than usual interest, owing to the special character of the business transacted.

The Academy, as many of our readers know, but of which fact the general public persists in remaining very ignorant, is the highest scientific body in the United States, and an election to its membership is the greatest honor that an American can expect to receive at the hands of his countrymen. To this Academy all questions of scientific importance that come up in the administration of the government are referred for final decision. Even matters of the utmost delicacy, such as one involving the life or death of a geological survey, have been passed upon by them and their decision accepted without an appeal. Its membership is limited by law to 100 members, and it is never full. Indeed, in recent years, owing to the large number of candidates proposed, no choice was possible, and the number of members had been reduced by death to below ninety.

Two meetings are held each year,

one on the third Tuesday in April, always in Washington, D. C., and the other, usually elsewhere, about the 1st of November. The stated meeting, as the one held in the spring is called, was convened on April 16 in the lecture room of the United States National Museum, and continued its sessions until April 19.

Among the features of this year's meeting that gave it unusual prominence was the election of a new president. In the more than thirty years of its existence, for it was founded in 1863, by an act of Congress, the Academy has had but few presiding officers. Alexander D. Bache, who for so long a time filled the high office of superintendent of the United States Coast Survey, was the first to receive the presidency from the hands of his associates. From the inception of the Academy until his death in 1868 he filled that place. His able colleague in Washington, Joseph Henry, the first secretary of the Smithsonian Institution, came next, and for ten years, with courtly grace, he presided over the meetings of the Academy. He died in 1878, and William B. Rogers, the founder and president of the Massa-

chusetts Institute of Technology, was chosen as his successor. His term of office was comparatively short, and scarcely had four years elapsed when he was called to join the silent majority. The Academy then inaugurated a different policy, and Professor O. C. Marsh, of New Haven, so well known for his studies in paleontology, being at that time vice-president of the Academy, was confirmed in the higher office by his associates at the ensuing election. Professor Marsh was then and is still in the prime of his mature manhood. He filled the office with ability and judgment for two terms of six years each, and, having declined a third term, stepped down into the ranks again.

To fill his place the Academy has chosen a veteran, and Wolcott Gibbs, of Newport, R. I., the Nestor of American chemists, was given the high office of president of the National Academy of Sciences. To even briefly review the career of this eminent scientist would be an arduous undertaking and one that, to be well done, must be lovingly done; for among the teachers of science no one has so thoroughly succeeded in attracting students by the charm of his personal magnetism, since the time of Louis Agassiz as Dr. Gibbs. A word or two must be given of his record.

Seventy-three years ago, in February he was born in New York City, and after graduation at Columbia and study in Europe, he became a teacher of chemistry. In 1849, a date when several of the members of the Academy were not yet born, he was called to the chair of chemistry and physics in the College of the City of New York, and, in 1863, he went to Cam-

bridge to accept the Rumford professorship in the Lawrence Scientific School of Harvard University. Having served there for more than a quarter of a century, he was made emeritus, and then retired to his home in Newport, where he devotes the leisure of his maturing years to the prosecution of original investigations. During the civil war he was a member of the executive council of the United States Sanitary Commission, and to him credit is given for the idea out of which the Union League Club has grown, of which he is the senior honorary member. In returning to its earlier traditions and choosing to its highest office the most distinguished of its members, the Academy has adopted a course that cannot but be of benefit to it.

A home secretary was also chosen at the recent meeting. Asaph Hall, who found the moons of Mars for the World in 1877, and achieved fame at the same time, was continued in the place that he had so acceptably filled for many years. The headquarters of the Academy are in Washington, and therefore it is desirable that the office of the secretary should be there also. Professor Hall was for many years connected with the United States Naval Observatory, and is now on the retired list, with leisure at his command.

In addition to the officers mentioned, George J. Brush, of the Sheffield Scientific School; Benjamin A. Gould, of Cambridge, Mass.; Simon Newcomb, of the United States Nautical Almanac; Ira Remsen, of Johns Hopkins University; George L. Goodale, of the botanical department of Harvard University; and Othniel C.

Marsh, of the Peabody Museum of New Haven, were elected new members of the council.

Interest was not only confined to the election of new officers, for it extended to the new members were chosen. Notwithstanding the number of vacancies, never more than five new members are chosen to the Academy at one time, and members can only be elected at the stated meeting. No candidates have been chosen since 1892, but this year four were agreed upon. They were: William L. Elkin, of the astronomical department of Yale University; Charles S. Sargent, who fills the chair of arboriculture in Harvard University, Cambridge. William A. Welch, of the Johns Hopkins University, whose recent researches in biology have been so valuable, especially in the direction of determining with exactness the presence of rabies in persons bitten by animals afflicted with hydrophobia; and Charles O. Whitman, whose researches in marine life have resulted in his recent appointment to the University of Chicago.

Besides the home members, three foreign associates were chosen. They were Prof. Rudolph Lenkart, who for so many years has been in charge of the Zoological Institute in Leipsic, Germany; Prof. Sophus Jie, the famous Norwegian astronomer, who now fills the chair of that science in Leipsic; and Prof. Julius von Sachs, the director of the Botanical Gardens in Wurzburg, Bavaria. It is perhaps well to add that foreign membership is likewise restricted, and there are never more than fifty foreign members.

The Academy has also a substantial

way of honoring scientists, for it is the custodian of several trust funds, from the interest of which gold medals are awarded from time to time for discoveries or advances made in special branches of science. Conspicuous among these is the Watson medal, derived from a fund of \$13,000 left some years ago to the Academy by James C. Watson, from the interest of which "a medal is to be prepared to be awarded to the person in any country who shall make any astronomical discovery or produce any astronomical work worthy of special reward and contributing to the progress of astronomy." Four times has this medal been given: first to Benjamin A. Gould in 1887; then to Edward Schoenfeld, of the University of Bonn; then to Arthur Auwers, of Berlin, and last year it was awarded to Seth C. Chandler, of Cambridge, Mass., for his researches on the variations of latitude and the variable stars. The public presentation of the medal took place in Washington this year. The medal is accompanied by a gold purse of \$100.

A medal resulting from a fund left to the Academy by Frederick A. P. Barnard, who for so many years was president of Columbia College, valued at \$200 and known as the "Barnard Medal for Meritorious Service to Science," a copy of which is to be presented at the end of "every five years to the person who during that period, shall have made such discovery in physical or astronomical science, or such novel application of science to purposes beneficial to the human race, as shall be deemed the most worthy of such honor," is also at the disposal of the Academy. The



An Albino Muskrat. Mounted by Adolph B. Covert, Ann Arbor, Mich.

first award of this medal was made this year, and the fortunate recipient was Lord Rayleigh, to whom it was given for his discovery of argon in the atmosphere.

Comparatively few papers were read at the recent meeting. In fact, the original programme contained only twelve titles; but others were announced subsequent to the arrival of out-of-town members. The scientific session, which is held in the autumn, is more likely to afford a large number of contributions from the members. It will be held on October 20, in Philadelphia. One feature of the Academy that deserves a word, in conclusion, is that of the reading of biographical memoirs of each deceased member. This year one on Dr. Lewis A. Rutherford was read by Benjamin A. Gould.—*Scientific American*.

New or Little-known Plants.

An Arizona Agave.

No group of North American plants, with the exception, perhaps, of the Cacti, is more difficult than the Agaves to understand from specimens preserved in herbaria; and not much light is thrown upon these plants by the occasional isolated individuals which drag out a more or less miserable existence in the confinement of northern glass-houses. Much confusion naturally exists in the identification of plants which have been named for the most part from half-grown and often flowerless individuals in European gardens, and it is more than probable that the same species often appears in books under numerous names. There are no plants, however, that are so well suited to produce certain effects in the garden, especially in countries warm and dry enough to enable them to flourish in

the open ground; and it is desirable from the horticultural as well as the botanical point of view that they should be studied under the most favorable conditions. These can only be found when all the forms of the genus planted side by side in some favorable region carefully selected for the purpose are studied by a competent botanist in all their stages of development. This is the only way the limits of the species can be determined and their synonymy satisfactorily settled. The astronomical observatories of some of our universities establish posts of observation in remote countries in order to study certain phenomena of the heavens under the best possible conditions, and the great scientific gardens of the world might in the same way increase their usefulness by establishing in regions of peculiar climates, collections of certain groups of plants which cannot be studied in herbaria, or under the artificial conditions afforded by the glass-houses. For example, all the Agaves, Dasylirions, Beaucarnias, Yuccas, Nolinas and Cacti would grow to perfection in a garden in southern New Mexico or Arizona, and in such a garden a good botanist would be able to learn, in the course of a few years, more about these plants than has ever been learned before. Agaves will never be known until this method is adopted, and Cacti certainly will not, for a Cactus in a pot rarely fruits, and often changes its appearance to a degree that makes it unrecognizable.

For the satisfactory elucidation, therefore, of the flora of northern Mexico and the adjacent parts of the United States, where such plants are the conspicuous and most interesting features of the vegetation, a well-

equipped local station is essential, and we hope some day to see this plan put into operation. In the mean time, labor expended in herbaria on the study of the plants we have mentioned is practically thrown away, as it can only be partial and never final.

There are not many species of *Agave* that grow spontaneously in the territory of the United States, but some of these are very beautiful.

The *Agave Huachucensis* one of the handsomest of the family grows in large masses, usually along the upper edge of the mesa and below the forests of Live Oaks which clothe the lower slopes of the mountains.

It resembles, however, in many respects the *Agave appianata* of Lemaire, and is not readily separable from Engelmann's *Agave Parrii*, which, in its young state at least, is not always distinguishable from the *Agave Palmeri* of the same author, or from a species of western Texas into which, perhaps, this plant also ranges. The name, however is not important for our purpose, which is to call attention to a very beautiful plant which seems to be still little known in cultivation.—*Garden and Forest.*

Collecting Carolina Paroquet.

Conurus carolinensis.

During my recent trip to Florida I had been told numerous tales of Paroquets, which failed to materialize on investigation, so I had become quite skeptical when told of localities where they were sure to be found.

While preparing to return home, I made the acquaintance of an old trapper, a man perfectly familiar with the country and having a general knowledge of its birds and mammals. Of course

our conversation turned on the Paroquets and he informed me that he knew where there had been some last December and he thought we could find them if I would go with him a few days, so I engaged him, and Monday morning March 25th, 1895, after purchasing a few articles of food and taking with me a small collecting outfit, we started for the shore of the lake where he kept his boat. I carried my gun and bedding and the guide had our can of provisions and my box of cartridges with which we had to wade to the boat.

The old saying that a bad beginning makes a good ending, was exemplified on this trip as the old fellow slipped from a plank on which he was walking, and dropped the can of food and my cartridges overboard. Fortunately the water was shallow, and the things were recovered without much damage being done, except to my feelings.

The boat we had to cross the lake in, was a small skiff 13 feet long, carrying one sail, our weight placing it very low in the water.

The breeze freshening up very much after starting, I tied my gun securely in the boat and prepared to take an involuntary bath, as every few minutes a wave would break over the side of the boat.

Part of the time I held the sheet rope to the sail in one hand and used the bailing can with the other hand to keep from swamping.

Finally we reached the other shore of the lake but several miles from where we had intended to land. Fortunately there was a Cracker family living near, having a horse and wagon whom I engaged to drive us to our destination, a deserted cabin about four miles away.

On reaching the house we found it had recently been occupied by a Cracker who kindly invited us to stop with him. The next morning we started our search for the Paroquets and hunted an extensive Cypress Swamp and Palmetto Hammock but our search was useless.

On our way back to camp we stopped at a house to make inquiries about the birds, and found they occasionally came near the house to feed. The people very kindly invited us to dinner which the guide availed himself of, and while eating, I observed some Paroquets fly into a tree in the rear of the house. He at once called me and on approaching the tree I saw on an upper branch a Paroquet which I shot. At the report of my gun three others flew from the tree, one of which I secured. The remaining two darted swiftly past me again, my next two shots missing them.

They evidently took this as a hint to leave as they at once started in the direction of the woods and were lost to sight. After picking up the two birds and arranging their plumage, I listened to hear if the other birds were calling. I thought I heard the note in the distance and set out with the guide to look for the birds, we searched for some time unsuccessfully, when in a large oak tree I saw one of the birds which I shot, the other bird flew and I killed it with my next shot, this event closing my experience with the Paroquet in life.

EDWARD J. BROWN.

Washington, D. C.

The Byron Reed Collection.

The museum of the Omaha Public Library was opened to the public a few days ago in the room assigned it in the new Library Building. This collection (which is known as "The Byron Reed Collection") was bequeathed the City of Omaha, Neb., about two years ago by Hon. Byron Reed, and consists of a very fine collection of old and valuable books, manuscripts, portraits, autographs, old newspapers and periodicals, paper money, coins and medals and is valued at about \$80,000.)

A few of the books relating to Natural History, are, Audubon's "Birds of America" and "Quadrupeds of North America;" Wilson's "American Ornithology;" Studer's "Birds of North America;" Coues' "Birds of the Colorado Valley," "Birds of the Northwest," "Fur-bearing Animals" and "Key to North American Birds;" Baird's "Mammals of North America;" "The Ancient Fauna of Nebraska," and many others.

Among the old and valuable books are the writings of Marquette, La Salle, Uliola, De Leon, Hunepin, Lewis and Clark and many other works on American Discoveries, Politics, Conspiracies, and Governmental affairs.

There are also many complete files of periodicals, such as, the *Monthly Review* (1669 to 1894), *Popular Science Monthly*, *Harper's Monthly*, *The Spectator*, *Spirit of the Times*, *The Junius Letters*, *Quarterly Register*, *Niles' Weekly Register*, *London Satirist*, *American Journal of Numismatics*, *Canadian Antiquarian Collector's Journal*, *Numismatics Chronicle* (1838-89) and a bound volume of the *Weekly Museum*, published in New York city, 1803 to 1806, (Where

the name applies I am unable to see as the paper is full of society news and gossip, romantic stories and comic poems).

The collection of autographs is very interesting and contains autographic letters of every President of the U. S., every signer of the Declaration of Independence, crowned heads of Europe, all the great poets, authors, historians, explorers, actors, etc., etc.

The collection of U. S. coins is the third in size in this country and contains about 1300 coins and patterns. Among the coins worthy of mention are two "Stellas" or \$4. gold pieces (1879), New England, oak and pine tree shilling, 6d, 3d and 2d; Massachusetts cent (1787), half cent (1787-88), Lord Baltimore shilling and 6d (1659), Baltimore townspence (1790); Connecticut cent (1788); Rose Americana 2d, 1d and $\frac{1}{2}$ d (1723) and farthing and $\frac{1}{2}$ d (1722); Louisiana Sow (1721), cent (1722), farthing (1758); Wood's $\frac{1}{2}$ d and farthing (1723); Chalmer's Annapolis shilling, 6d and 3d (1783); Washington cents (1783-89-91-92-93); Washington half dollar (1776-92-96); Mind your own business Continental currency; Washington dime (1792), Martha Washington $\frac{1}{2}$ dime (1792) and many other rare and more valuable American coins.

The most valuable American coins in the collection are an 1804 silver dollar, (worth \$1,000) and an 1827 quarter dollar (worth \$400.)

The collection of ancient coins is the most complete in America and consists of a collection of 400 Greek silver and copper coins dating back as far as 700 B. C., 1500 Roman silver and copper coins dating as far back as A.

D. 14 and a very large series of the Jewish coins dating from 143 B. C.

There are about sixty coins of Constantine the Great showing the first coins bearing the first recognition and emblems of Christianity.

Also a fine collection of mediaeval copper and silver coins, Russian copper and silver coins, Siberian copper coins, Siamese silver bullet money, etc., etc.

A large series of U. S. presidential medals; gold, silver and Bronze U. S. army and navy medals and the only complete set of Bavarian medals in America. Also a very large series of other European medals and tokens.

The collection of coins was started in 1844 and was continually being added to until the death of Mr. Reed about two years ago.

The collection of Colonial currency is very complete and interesting as are also the collection of old documents and manuscripts, etc.

It is impossible to do this collection justice on paper and all I can say in conclusion is that, should any reader of THE MUSEUM pass through our city that they will be fully repaid if they spend a day with the Byron Reed Collection, where the lady in charge will explain and exhibit the many interesting features of this monument of 50 years of enthusiastic collecting.

ISADOR S. TROSTLER,
Omaha, Neb.



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Not since the flood, so graphically described in the Old Testament, has such a catastrophe as Mr. Jean T. van Gestel relates, been told by an eye-witness. The eruption of Krakatoa swept out of existence nearly 120,000 persons. Of this terrific cataclysm Mr. van Gestel, the only living eye-witness, tells the story in the April Cosmopolitan. Lady Colin Campbell's interesting article, "English Country-House Parties," is the first presentation in an American periodical of an interesting phase of English life. No one could write with a better knowledge of the subject, or a brighter pen, than Lady Campbell. The last six pages of the April Cosmopolitan present a new feature which appeals to lovers of art. These six full-page copies of six famous paintings of recent work reflect what is being done in the world of art. The famous Spanish artist, Cabiriny, is again seen to advantage through his beautiful drawings as shown in Gertrude Hall's eleventh story, "The Late Returning." The Cosmopolitan is giving its readers a thorough discussion of the China-Japan war. General Lord Wolseley presented the first paper, and is followed in the April number by Hon. George Frederick Seward for many years plenipotentiary at Peking.

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WALTER F. WEBB,

ALBION, N. Y.

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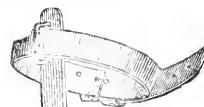
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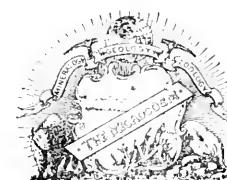
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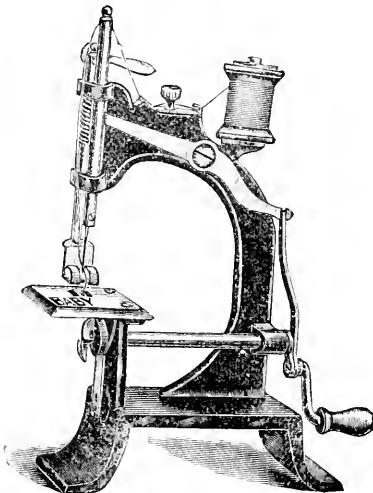
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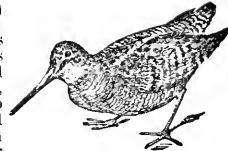
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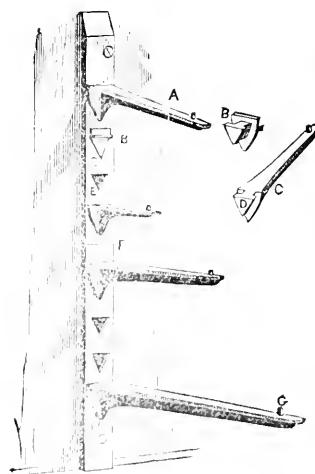


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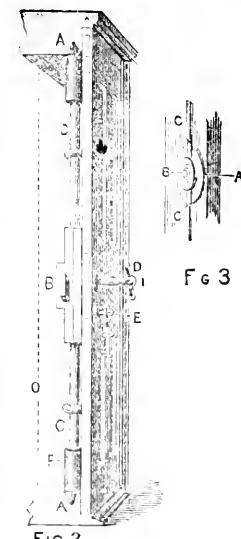
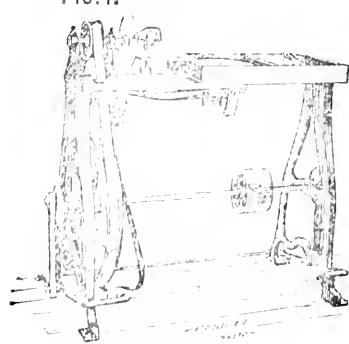


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VOL. I.

NO. 8

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THE MUSEUM.

A Monthly Magazine Devoted to Research in Natural Science.

VOL. I.

ALBION, N. Y., JUNE 15, 1895.

No. 8.

The Swallow-tailed Kite.

Elanoides forficatus.

In connection with our excellent picture of The Swallow-tailed Kite and its eggs, we have taken the liberty of quoting portions of the life history of this species as written by Capt. Chas. E. Bendire, Curator of the Oological Department of the National Museum, at Washington, D. C., in his work entitled "Life Histories of North American Birds."

GEOGRAPHICAL RANGE:

"Tropical and warm temperate portions of North America; north in the interior regularly to Illinois, Iowa, Minnesota, casually to Manitoba, and Assiniboia, etc.; along the Atlantic coast casually to Pennsylvania, New York, and southern New England; accidental in England.

"Although the breeding range of the Swallow-tailed Kite within the limits of the United States must be considered to be quite extensive, it is a very irregular one, and the birds are only summer residents over the greater part of their range. It breeds regularly in Florida and South Carolina, and probably farther north along the Atlantic seaboard, in the states of North Carolina and Virginia, and apparently even in New York state, where several Kites were observed on different occasions in Renssleer County, in the latter part of July and the beginning of August, 1886, strongly suggest-

ing their breeding in that vicinity during the season in question.

"From Florida westward it is irregularly distributed through the Gulf States, including the greater portion of Texas. It also breeds in the interior in suitable localities throughout the entire length of the Mississippi Valley, and in the states adjacent to our northern boundary, and a few pass this, as it has been observed on different occasions in the British provinces of Assiniboia and Manitoba, in latitude 50 degrees.

"Stragglers have been taken during the summer months in many of our Northern States, as well as in England, but few winter within our borders, and, excepting in portions of Florida and Texas, it must be considered as rather a rare species throughout its summer range. It is also found throughout a greater part of the South American Continent as far south as the Argentine Republic and Chile.

"Dr. William L. Ralph, who has had excellent opportunities to observe the Swallow-tailed Kite in Florida during several seasons, writes me as follows about it: 'Excepting, perhaps, the Turkey Vulture, I think this bird is the most graceful of any while on the wing. It has the same easy floating motion, but at times it flies very rapidly and turns very quickly, which is something I have never seen the former bird do. Their motions are very "Swallow-like;" and that, with their forked tails; makes them look like gi-

gantic Barn Swallows; and like the Chimney Swifts when they have a habit of traveling together in small companies, usually consisting of three individuals, especially when they first return from the South. During the breeding season flocks consisting of from two to three, to ten or twelve birds, but oftener of three, may be seen following one another around, frequently uttering their calls and circling in and out among the tree tops so fast as to make one dizzy to look at them. Except during this season one seldom sees one of these birds unless it is flying, and I have often wondered if they did not at times sleep while on the wing. At least I know that they usually if not always eat while flying, for I have many times seen one sailing leisurely along, occasionally bending its head to tear a piece from a small snake that it held in its talons, and I have never seen one alight to eat its food, as other birds of prey do.

"When hunting they fly quite close to the ground, like Marsh Hawks, but at other times they sail above the tree tops, sometimes so far above that it takes a good eye to see them. Their food consists almost entirely of reptiles. Small snakes seem to be a favorite article of food with them. I never have seen one catch a bird, and believe they do not. This habit of catching snakes has given them the name of 'Snake Hawk' among the natives of Florida.

"Swallow-tailed Kites begin to arrive in this state from the south about the middle of March, but do not become common until two or three weeks later. They appear to be as abundant now as formerly, probably because most of the tourists have left Florida

before they arrive in any numbers. Although these birds are common in the southern half of St. Johns county, and that part of Putnam county east of the St. Johns river, and though I have found quite a number of their nests, I have never been able to get but two sets of their eggs, owing to a habit they have of building in places that are very hard to reach.

"The first nest was taken April 22, 1887, eleven miles north-east of Palatka, Florida, and contained two eggs, so nearly hatched that the embryos in them were feathered. It was situated 90 feet above the ground in, or rather on, the top of a very slender pine tree growing on the edge of a cypress swamp. The trunk of this tree at a height of five feet above the ground was not more than fifteen inches in diameter, and at the place where my climber stood, as he took the egg, it was less than three inches, while the limbs he stood on were only an inch thick. The nest was composed of large twigs thickly covered with Spanish moss (*Tillandsia usneoides*) and long moss *Usnea barbata*), lined with the same materials, with the addition of a few feathers from the birds. It measured twenty inches in length, fifteen in width, and twelve inches in depth on the outside, and six inches in diameter by four inches deep on the inside.

"The nests of this species are usually so very irregular, that I should think they simply hollowed out bunches of mossy twigs that they found lodged in the tops of trees, had I not often seen them carrying this material to nests that they were building.

"Both birds were present when the eggs were taken and made much ado.

They would dive at the head of my climber, uttering their shrill but rather feeble cry, and at times were so fierce that he had to stop and strike at them with his hat to prevent them from striking him. This set of eggs is the earliest I have record of, and if it takes these birds four weeks to hatch their eggs, as it usually does the larger Hawks in the north, they must have been laid before April 1st. They usually commence laying about the middle of April, and I have found them sitting on their nests from that time until the 1st of June, being the latest date I ever remained in Florida. Most of them have their eggs laid by the middle of May. One nest which I saw these birds building was deserted for three or four weeks and then reoccupied, but whether or not by the original pair, I do not know.

"The second nest was taken 7 miles northeast of San Mateo, Florida, April 14, 1888, and contained two fresh eggs. It was also situated in the extreme top of a slender pine, in every respect an exact counterpart of the one that held the first nest. The difference in the height of the two was less than a foot. As nearly as I could judge about three-fourths of the nests of this species found by me were about the same distance above ground, *i. e.*, they were 90 feet, and the remainder from a little above that height to 125 or 130 feet. The birds to which the second set belonged were not so pugnacious as the owners of the first, but they made a great fuss, and soon had four others of the same species with them to see what was going on, and these seemed as much concerned at the disturbance of the nest as the owners themselves. They were less

fierce than the first on account of their eggs being fresher, for, like all birds, they exhibit more anxiety just before and just after the eggs are hatched than at any other time. The nest of this pair was composed of large twigs, Spanish moss, and pine needles, lined with green moss and small twigs. The earliest date on which I found this species breeding was April 5, 1891, when I took a set of two eggs, 8 miles southeast of San Mateo, Florida. Both eggs were rather smaller than the usual size and also lighter colored. One had been incubated for about a week, the other was fresh. The nest was situated in the extreme top of a slender pine, 86 feet from the ground. Both parents made much ado, flying down at my climber from above at an angle of about 45 degrees. The call note of this species sometimes sounds very much like the 'peet, peet,' of the Spotted Sandpiper.

"I think both parents assist in incubation, and that but one brood is raised in a year. In Florida, like the Bald Eagles, they nearly always nest in pine trees and in the tallest they can find, but, unlike the latter, which always select trees of the greatest diameter, they choose the very slimmest.

"They usually breed in wild uninhabited localities, but, except in regard to their nests, they appear to have but little fear of man, and are often to be seen flying around among the houses of the small villages in this vicinity. The places resorted to for breeding are the low lying pine woods, and the nests are usually built in trees that grow in or near the cypress swamps, so common in these situations.

"The Swallow-tailed Kite has a peculiar way of leaving its nest, for



SWALLOW-TAIL KITE AND TWO SETS OF TWO EGGS EACH, IN COLLECTION OF MR. C. E. DOE, PROVIDENCE, R. I. From Photo.

instead of flying directly from one side, as other birds do, it nearly always rises straight up for a short distance first, as if it were pushed up with a spring, and, when about to alight on its nest, it will poise itself a short distance above its eggs and then gradually lower itself down on to them. When they are thus poised above their nests there is scarcely a perceptible movement of their wings, and they often lower themselves so gradually that one can hardly tell when they have reached their eggs.

"The Swallow-tailed Kite is, on the whole, a perfectly harmless and bene-

ficial bird, feeding to great extent on reptiles of various kinds, beetles, grasshoppers, crickets, cotton worms, small frogs, and tree toads. It is doubtful if it ever kills a bird.

"In Texas, the Indian Territory, and Kansas, this species builds frequently in the tops of the tallest cottonwood trees, occasionally in pine oaks or pecans, where these are found, and always as near to the tops of trees as the nest can safely be placed.

"Nidification varies according to locality, beginning about the first week in April in the more southern portions of its breeding range, and correspondingly later farther north, sometimes

not before the first or second week in June.

"Two eggs are generally laid to a set, occasionally but one, and rarely three or four. The average measurement of twenty specimens from different parts of the United States is 47 by 37 millimeters. The largest egg in this series measured 50 by 39, the smallest 41.9 by 34.5 millimeters. I consider these eggs as handsome as any of those of our *Raptoreos*. They are usually oval in shape; some approach on elliptical ovate. The shell is moderately smooth and close grained. The ground color varies from a dull to an ashy white, and again it may be a delicate cream color.

"The eggs are spotted and blotched with different shades of rich brown and ferruginous, usually irregular in outline, and varying considerably in amount. These markings sometimes form an irregular band running from the center to the smaller end, and frequently become confluent. Occasionally a specimen is found in which the markings are very few and small in size, scarcely any being larger than a No. 10. shot, and the majority smaller. In a few specimens light lavender colored shell markings, generally of small size, are also visible. There is a great deal of difference in the style and markings of these eggs if a number are compared, but they can readily be distinguished from the eggs of any of our *Raptoreos*.

Cypraea.

Col. Wilmer a veteran English collector said to me as we were rambling through the British Museum that the first love of the amateur collector of shells was the Cypraea: that he next

wandered to the Murices and Cones, but with the sober second thought he finally settled down, for his life work on the Helices. If the Colonel's observation is correct, mine is a case of arrested development: for I have never swerved from my allegiance to my first love—the beautiful cowries,—although I have been for nearly 20 years a collector in a modest way. Their brilliant and varied colors, their markings shaded and blended as if limned by some rare artist, make them to me the loveliest gems of the ocean, and worthy of their name of Cypraea, a title of Venus, the goddess of love and beauty of the ancient Greeks. The French on account of their brilliant glossy surface, call them porcelaines.

The shell of the Cypraea is described as—ventricose, convolute, spire concealed, aperture long and narrow, inner lip crenulated, outer lip inflected and crenulated. The shell of the young Cypraea does not bear a very close resemblance to that of the adult. The spire is exposed and the outer lip thin and it might easily be mistaken for a Voluta. The Cypraea are carnivorous, living on minute marine animals, the coral builders being a favorite tid bit with them. They inhabit for the most part the tropical seas and live in shallow waters near the shore, which gives the sun its full photographic power to make their shells the brightest tinted of the whole phylum. They lead very tranquil lives, moving neither far nor fast. They are provided with broad mantles, which when fully extended envelop the entire shell.

Their mode of growth has long been a matter of dispute. Some of the older writers of great eminence

claimed that when the Cypraea had outgrown his domicile and desired a little more elbow room he simply crawled out of his shell and built him a "more stately mansion." This theory was taught by Bruguiere, Lamarck and other eminent conchologists. Another theory is that the animal dissolves its shell wholly and builds anew, and one writer claims to have watched one go through the whole process.

Either of these plans would account for the fact that some very young and immature shells are more than double the size of other adult shells of the same species. For instance I have a C. Exanthema more than five inches in length which is very immature being without teeth and without the beautiful spots which give it the name of the ocean flower: while many adult shells of that species are less than half as large. Another theory is that the inside is dissolved away gradually and the outside added to.

They are very skillful in repairing their shells when broken. I have one which bears evidence of having been dashed with great force against a rock and splintered in more than twenty directions and almost broken in two. It was repaired so artistically that the fracture was not apparent to the touch, but could be followed by its being of a lighter color. There is a C. mappa in the Liverpool Museum which is finely colored with exception of a triangular spot, which is white; which defect was evidently caused by a wound in its mantle, some Devilish probably having nipped out a piece, before he had secreted the pigments wherewith to adorn his mansion.

There are over two hundred species of Cypraea, although the distinction

between certain species is more imaginary than real. In some cases dealers have been accused of adding to the list in order to sell a shell to each of their regular customers. For instance *C. staphylca* and *C. interstincta* only vary slightly in color. *C. histrio* and *C. reticulata* are hardly distinguishable—*C. intermedia* is a certain shape of *C. caput serpentis*—*C. camelleopardus* is a certain color of *C. vitellus*—*C. bicornis* is *C. mus* with two little spots—*C. rattns* is *C. stercoraria* with a sharp back—*C. cervinetta* is a small dark *C. exanthema* and there are half a dozen species that vary but slightly from *C. hirundo*.

The largest collection of Cypraea is that in the British Museum of Natural history at South Kinsington. I counted them as carefully as I could and made out one hundred and ninety seven species. Four of their specimens are almost unique: viz. *C. leucodon*, *C. marginata*, *C. princeps* and *C. guttata*, and many others are very rare. They have recently purchased a remarkable orange *Cypraca* of immense size, deep color and perfect form. It is far superior to any in any of the great public collections. Their *C. princeps* is one of the most beautiful shells I have ever seen.

I counted in the Philadelphia Academy one hundred and eighty-eight species and Prof. Pillsbry opened the cases and permitted me to handle and examine some of the rarer gems of the collection. By the way, I will say here that Curator Edgar Smith of the British Museum said to me that Tryon's Manuel was vastly improved since it was placed in the hands of Prof. Pillsbry, which I consider a very high compliment.

The collection of *Cypraea* in the Garden of plants in Paris is a very fine one and is the one from which those fine drawings in the works of Chenu and other French authors were taken.

The cases however are in a poor light and so badly arranged that not one half the labels can be read.

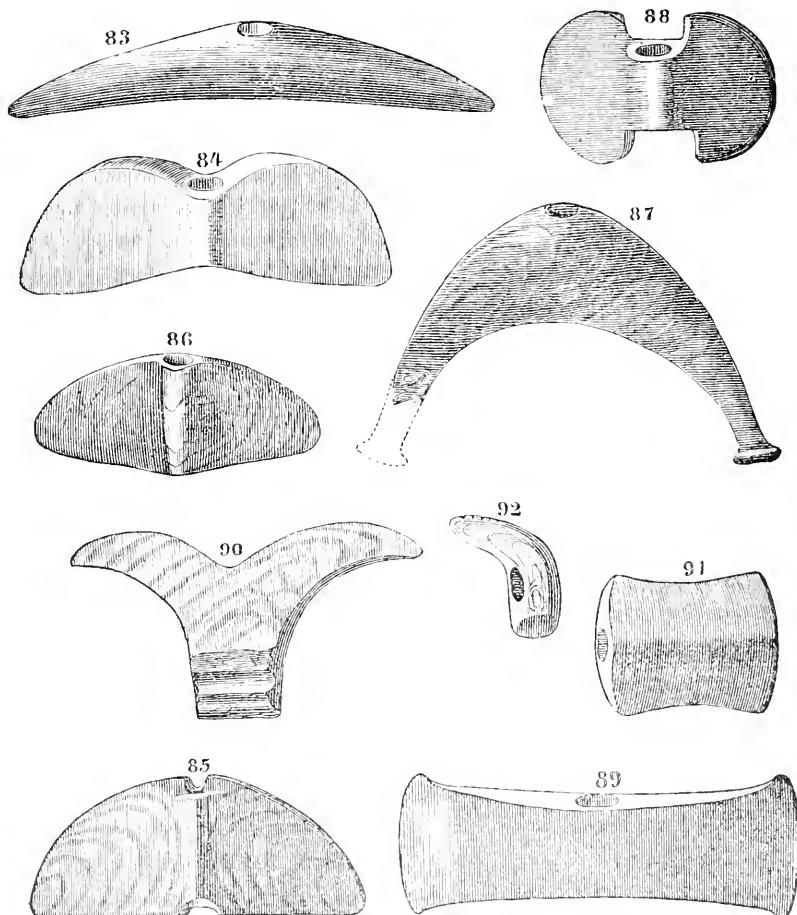
Our national collection in the Smithsonian is a disappointment to nine hundred and ninety-nine of every thousand visitors. I suppose it is eminently satisfactory to the one in a thousand who is shown through the private cabinets, but that is no consolation to us of the nine hundred and ninety-nine. In the public cases these are not to exceed a thousand species all told, and in some of the cases each species is given a big dinner plate to stretch itself in. If the space was properly utilized at least three times as many species could be exhibited. There are many country villages in Illinois in which may be found collections containing from two to five times as many species as are exhibited in the public cases of our national collection. There are shown only about twenty species of *Cypraea* and they are largely of the commercial—fifteen cents a dozen—class. In my little collection I have one hundred and sixty-two species of *Cypraea*. While the Smithsonian probably shows a smaller proportion of its treasures to the public than any other great collection in the world, the Philadelphia Academy shows the largest proportion of all, as the drawers under the cases containing the duplicates and series from different localities are all covered with glass and free to every visitor.

The most beautiful American *cyprea*

is *C. spadicea* and it is excelled by few in any clime. It is found at San Pedro near Los Angeles and at other points in California.

The Orange Cowry is the emblem of dignity and authority in the Friendly Islands and none but a chief may wear it. *C. moneta* has been the coin of the realm in certain parts of Africa from high and antiquity. Marco Polo notes their use in the thirteenth century. In 1848 sixty tons, and in 1849 three hundred tons of them were shipped to Liverpool, to be reshipped to Africa to be used in barter with the natives. They pass at the rate of about four thousand to the dollar. In the Niger region a young and shapely wife costs a young man from fifty to seventy-five thousand *cyprea*, while an older one, minus a tooth or two or whose outline showed less artistic curves would go for twenty thousand. If I were writing a scientific paper I would *not* say right here that this may be the origin of the saying “shell out young man.” It is comforting to know that there is a currency that has been staple for six hundred years, in these times of money agitation.

We used to think that when we deposited a beautiful *cyprea* in our cabinet that we could confidently say we had a thing of beauty and a joy forever; but now it appears that a new disease has made its appearance which is as fatal to our cones and *cyprea* as are the new disease—appendicitis and grippe to our children. Prof. Edgar Smith showed me scores of fine and valuable shells which were attacked by a sort of parasitic mould, which destroyed their smooth surfaces and robbed them of their varied hues, causing them to have the appearance of dead

DRILLED CEREMONIAL WEAPONS ($\frac{1}{3}$).

and worthless shells which we would not pick up at the sea side. He knew no cause—no preventative and no cure for it. He did not know at what minute the pride of the collection—the famous five hundred dollar *Conus gloria maris* might be attacked. Prof. Whitfield of the American Museum, New York showed me some shells which had been spotted by what he thought might be a similar disease. I hope it will spare their magnificent *Argonauta argo*, which is without a peer.

Excuse these rambling notes, but if

I have succeeded in awakening any interest in the mind of any amateur collector, in the favorites which have been so great a source of pleasure to me, I have not written in vain.

DR. T. H. MC COY,
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Directions for Collecting and Preserving Fish.

BY TARLETON H. BEAN.

1. Wash the fish thoroughly in water, to remove the slime and dirt that are almost invariably present up-

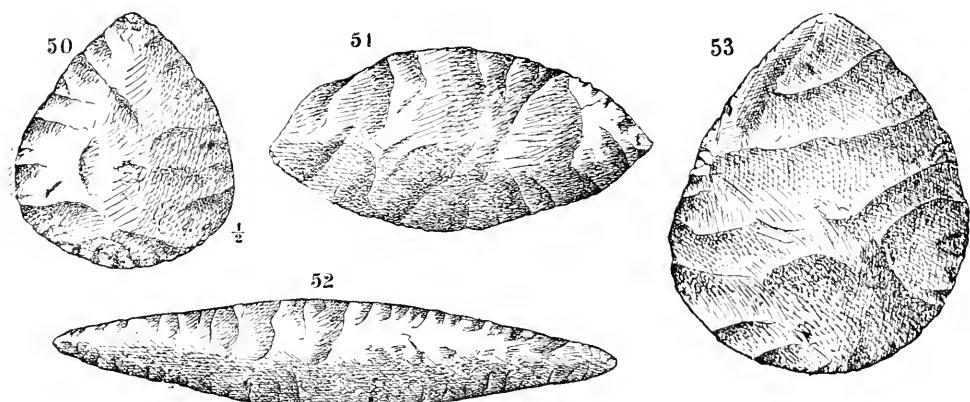
on them, not omitting the inside of the mouth and the gills. In cleansing fish that have a tough, scaleless skin, or such as have the scales firmly fixed, use a stiff paint brush or a scrubbing brush; for the thin-skinned fish and such as have deciduous scales, a softer brush must be taken. Some fish are covered plentifully with tenacious mucus that is with great difficulty removed by water alone; in such cases a solution of two tablespoonfuls of alum in a pint of lukewarm water will be found efficacious.

2. It is often necessary to preserve fish that are stale, or partially digested, and offensive to the smell. Such examples may be thoroughly disinfected by the use of the disinfecting solution of chloride of soda. Use a tablespoonful of the solution in one pint of water. With this wash the gills, and pour it into the mouth and stomach, allowing it to return by the mouth.

3. Inject alcohol in the mouth and the vent, to preserve the viscera. Make small incisions in the belly and in the thick parts of the body, to allow the alcohol to penetrate the tissues. It is often necessary to remove the liver, stomach, and intestines from large fish, and to preserve these separately, numbering them so as to correspond with the fish from which they are taken.

4. It is a good plan to keep freshly collected fishes in weak alcohol for a day or two; a mixture of two parts of 95 per cent alcohol to one of water will answer for this temporary immersion. Some species are exceedingly soft and flabby, falling to the bottom of a glass jar or other receptacle, becoming partly imbedded in their own

mucus, and rapidly disintegrating in consequence. Such specimens should either be suspended in the alcohol by a thread or string from the neck of the jar or the hook sometimes found on the inside of the stopple, or a bed of excelsior or muslin should raise them from the bottom; these are necessary precautions which will prevent many losses. After the fish have been kept for not more than two days in the weak alcohol, transfer them to a mixture of three parts of 95 per cent alcohol to one of water. Ordinarily this latter will preserve specimens that are not crowded too much at least three months; some, of course, will remain in good condition still longer; but, generally, three months will reduce the preservative power of the liquid so far as to make a renewal of alcohol necessary. The tendency with many collectors is to overcrowd specimens, and, as a result, museums frequently receive a lot of half-rotten material which is too valuable to be thrown away and is yet always a source of trouble and disappointment. A jar, tank, or case of any kind should never be expected to accommodate more than half its own bulk of fish, and even this proportion will require watchfulness to avoid loss. If a collection freshly caught is to be shipped to a distant museum or private collection, observe the directions about cleaning the fish and preserving the viscera separately if needful, and then use nothing weaker than a mixture containing three parts of 95 per cent alcohol and one part of water. A good mixture which will carry fish in very nice condition is the following: 95 per cent (or absolute) alcohol, 3 quarts; water, 1 quart; glycerine, 1



LEAF-SHAPED IMPLEMENTS.

pint; borax, 1 ounce. There is nothing better, however, than the mixture of three parts of alcohol and one of water.

5. The extensive collections of the United States Fish Commission are usually packed in copper tanks, which are tin-lined within. The lid of the tank is made to screw in the top and its diameter is always as great as the dimensions of the top will allow. The tanks (called Agassiz tanks) are made to contain 4, 8, or 16 gallons. Strong chests, of a size large enough to accommodate a 16-gallon tank, are used for shipping; the hinges and hasps of these chests are riveted on; handles are screwed on at the sides, and each chest is furnished with a strong lock. The chest may contain one 16-gallon tank or two of 8 gallons, or four of 4 gallons, or one of 8 gallons and two of 4 gallons, as may best suit the convenience of the collector. When several tanks make up the complement it is usual to separate them by thin wooden partitions.

Cases made of ordinary tinned sheet-iron are much more generally used

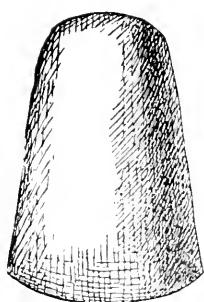
than the expensive copper cans, and they will answer well enough if the joints are perfectly tight and the top is securely soldered on.

Oak kegs, holding about 10 gallons each and provided with iron hoops, are capital containers for large fishes, and they will stand the wear and tear of railway travel better than most other receptacles.

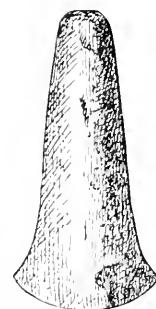
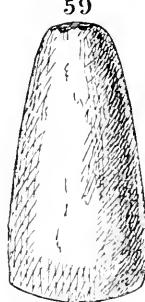
Glass preserving-jars may be shipped long distances with comparative safety, but they must be tested, by inverting them, to insure tightness; the top of the jar and the rubber band should be wiped dry; wrap the jars in strong paper and pack them in some material that will prevent breakage.

When corked bottles are used, tie a piece of bladder securely over the cork. Where seals and sea-lions occur, the throat, as prepared by the Aleuts for example, will be found an excellent covering. It is necessary to wet the membrane to make it pliable. Whenever jars, bottles, or any other small containers are filled with fish which are not provided with tin tags, write plainly with a lead-pencil on heavy

58



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CELTs (1).

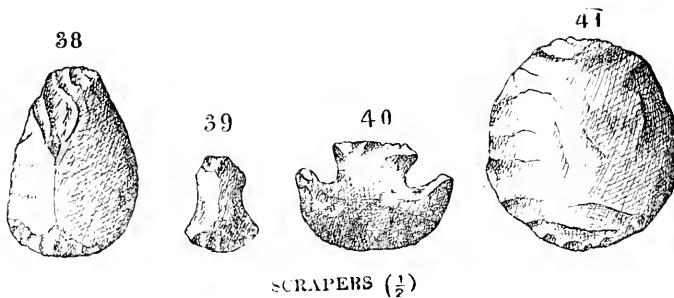
manila or writing-paper the name of the place where the fish were taken, the date of capture, and the name of the collector. Put a label of this kind inside of each bottle; it will remain legible for years.

6. Each specimen should be provided with a numbered tin tag, which is to be fastened, whenever possible, by means of a string passed through the right gill-opening and out at the mouth. When the string *must* be tied around the body or tail of the fish it should be fixed securely and yet without injuring any of the fins. A catalogue is to be kept by the collector, in which the numbers corresponding with those on the tags must be entered, with notes as to place, time, and mode of capture, and other particulars which will be more fully mentioned further on. Wrap each fish separately in common coarse muslin the coarser the better, and tie the ends securely. Do not tie the string so tightly around the body of the fish as to make furrows and wrinkles in the skin. If tin tags are not at hand, a label written firmly on stout paper with a lead-pencil should be wrapped inside of the covering of the fish. It is necessary always to fill the receptacle in which

specimens are packed—a bottle or jar may be either filled with alcohol or the specimens may be wrapped in muslin. It is not a good plan to put tow, excelsior, or cotton-wool on top of fish, as it presses them close together and prevents the free circulation of alcohol between them. For long journeys it is desirable to secure better protection than the muslin wrapping alone affords. This may be gained by placing beds of excelsior or thin wood shavings between the layers of fish and at the bottom and top of the case.

A plainly-written card placed at the top of the box, so as to be seen when the lid is removed, telling its contents and by whom it was sent, will save much trouble when the collection is to be unpacked.

7. Notes of color, taken from the fresh specimens should be sent with them if the fish are to be described in the museum. The collector should also preserve in his own books a record of life colors under the catalogue numbers corresponding with the tin tags fastened on his fish. He can then obtain the identification of his species by their numbers and publish his studies upon them at his own pleasure.



8. Local names of fish should always accompany the specimens when obtainable.

9. It is desirable to know whether or not the species is abundant; whether different sizes of the same fish are found; whether they associate in schools or not; whether they are permanent residents or migratory; if migratory, by what routes they come and go; whether they form an important article of food; what they feed upon and what species prey upon them; the depth and character of the bottom on which they occur; the mode of capturing them; the uses made of them and the various products which they go to form, in short, everything bearing upon the life history or the economic applications of the species should be noted in detail.

10. Before washing the fish look them over for external parasites; examine the gills and the inside of the mouth carefully, as these are favorite situations. These parasites often furnish a clue to the migrations of the fish; remove them if they can be taken off entire, if not, let them remain, and call attention to their presence in your shipping notes. Preserve the parasites in vials or bottles, and provide them with labels stating from what fish they came and in what situation they were found.

To preserve fish indefinitely in glass jars, observe the following directions: first, select a jar of the proper size to accommodate the specimen amply, without bending or distorting it in any way; put in the fish with the tail down in nearly all cases; the tail may often rest upon the bottom of the jar, or the fish may be suspended from the hook which is now found in the stopple of the modern museum jars; cover the fish completely with the alcohol mixture referred to in the closing sentence of paragraph 4; discoloration of the alcohol is a sign that its preservative power is weakened and calls for a renewal; fishes in alcohol will never make a good show unless the liquid is kept clear and clean. A label giving the name of the fish, place of its capture, and of its captor, should be tied on the neck of the jar by means of a piece of narrow tape passed through holes punched in the ends of the paper. The jars must have accurately ground glass stopples. It is the best to use no kind of sealing wax to coat the joint of the stopple; simply wipe the glass perfectly dry, close the jar properly, and there will be little danger of evaporation. Do not let the direct sunlight strike your jars, and keep them well removed from stoves, registers, and the like.—*Proceedings of the National Museum.*

THE MUSEUM.

A Monthly Magazine devoted to Ornithology, Oology, Mollusca, Echinodermata, Mineralogy and Allied Sciences.

Walter F. Webb, Editor and Pub'r,
Albion, N. Y.

Correspondence and items of interest on above topics, as well as notes on the various Museums of the World—views from same, discoveries relative to the handling and keeping of Natural History material, descriptive habits of various species, are solicited from all.

Make articles as brief as possible and as free from technical terms as the subjects will allow. All letters will be promptly answered.

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ALBION, ORLEANS CO., N. Y.

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NOTES.

Many parties have written us for small traps for catching mammals. See ad elsewhere which is the best article we have seen.

Mr. R. P. Sharpless of Illinois, recently secured a set of nine eggs of the rare Snowy Owl from the sale recently held in London, when two Great Auk's eggs sold at such a high price.

How many of our readers envy our correspondent, Mr. Davis, who is "Rustling in the Rockies"—Jackson's Lake on the bank of which he is living, is well-known as one of the richest of collecting grounds.

We call your attention to our branch stores for the summer of '95. If any collector gets near either place during July or August, or in fact our "headquarters" at Albion, don't fail to give us a call.

As many of our readers will doubtless spend July and August at some summer resort, we have included in this number directions for collecting various kinds of Natural History Specimens. These instructions will be found to be reliable, and we hope a source of both pleasure and profit.

Houghton, Mifflin & Co. are publishing a new edition of Minots, Land and Game Birds of New England, to be edited by Wm. Brewster. Mr. Brewster's name is a guaranty that the second edition will be far superior to the first. It will be 8vo—gilt top, and we can furnish to our subscribers at \$3.50.

The collecting of quartz, in all its varied forms says the *Mineral Collector*, seems to have become a positive "fad" among mineralogists. Within the past few months I have come across a score of collectors who have stopped collecting everything but quartz, and some are selling or exchanging all their other specimens in order to make room and raise funds for new quartz specimens, and I suppose the dealers will, ere long, be selling nothing but quartz.

One dollar pays for THE MUSEUM a whole year.

The Everglade Kite. *

The Everglades! Nearly every intelligent individual looks with interest on these words, but to him who loves to study the works of nature, they express volumes of untold wonders; for long has this section of Florida been an unknown land to the naturalist. Owing to their remote situation, but few white men ever enter their haunts; indeed, I will venture to state that it would be difficult to find a hundred individuals who have stood within their borders, and few among this number would possess any great degree of intelligence, while perhaps none would be students of nature. I had long desired to see this far famed spot, and was therefore much pleased to find myself on the banks of the Miami river, and learn that this beautiful stream was one of the numerous thoroughfares used by the Seminoles in passing to and from their homes in Pi-i-o-kee, the Indian name for the Everglades.

Not long after our arrival, four of us entered a small dingey with the intention of visiting these extensive marshes. This attempt however proved unsuccessful, for we were unable to stem the swift current with the boat so heavily laden. But a few days later, on the 18th of February, accompanied by a single individual, I again made the attempt.

We started early in the morning and rowed up the winding river, the margins of which were bordered for some distance with Mangroves. Leaving these we came into a more open country and caught sight of the pine barrens. Still we pushed onward, passed the only houses, or rather shanties,

that disgrace the bank, and entered the unbroken wilderness beyond. The river's edges were now overhung by a dense growth of flowering shrubs from which rose an occasional palmetto that hung its graceful fronds high in air, while here and there a dead live-oak stretched its whitened arms over the stream, and these leafless branches were chosen by the anhingas as perches. Here they sat in silence, moving their long, outstretched necks with graceful gesture, until we approached almost within gun shot, when they rose and flew quickly up stream. Large water oaks also overhung the river with their evergreen foliage, thickened with numerous parasitic plants and creepers which grew upon the hugh branches or twined graceful festoons over them. These secluded places were the chosen retreats of the Yellow Crown Night Heron, which as we drew near rose in flocks, with discordant screams and followed in the wake of the Anhingas. Small companies of White Ibis flew swiftly over, and high above us on motionless wings, circled an Osprey ever drawing nearer the head of the river. Several Kingfishers dashed past, rattling merrily as they flew to their fishing grounds above. The stream, however, grew narrower and the current very rapid, but everything seemed to invite us onward, and by redoubling our efforts, we were enabled to proceed slowly.

After a row of six miles, we reached the foot of some rapids. This declivity was quite abrupt, with steep, rocky sides, and the water rushed down in a furious manner. Stimulated by the thought that the unexplored region was beyond, we concluded to attempt the difficult passage and landed on the

* Taken from Maynard's "Birds of Eastern North America," pp. 285.

rocky bank which was destitute from vegetation for some feet from the water, and by means of the painter I drew the boat slowly up the foaming river while my companion kept it off the rocks with an oar. In this laborious manner we advanced for several hundred yards, passing a few tributary torrents and at last reached the top and launched our boat on the quiet waters of the everglades.

Our earliest recollections of this famous locality were taken from engravings by artists whose pencils were prompted solely by the imagination. These pictures represented a gloomy swamp overhung with dark leaved Cyprus, the roots of which were submerged in black and slimy water. In these sombre retreats, amid rank and noxious reeds, crawled great alligators and clammy serpents, fit inhabitants of this dismal region, the silence of which was described as being unbroken save by the harsh cry of the Heron or the hoot of the Owl.

But a far different scene met our gaze as we emerged from the Canon and glided smoothly over the bright and sunlit waters. Directly in front lay an immense plane of saw grass, which the fresh breeze caused to rise and fall in high emerald billows. This sea of verdure was bounded on the west by some distant islands, while on either hand appeared rich and fertile hummocks covered with a very thick growth of lovely trees and shrubs. Our ears were greeted with the familiar song of the Red-winged Blackbird. A Blue Heron sprang chattering briskly from the margin of the stream, and flocks of snowy plumaged Ibis rose from the grass, Anhingas and Cormorants darted through the clear air, while

the marshes resounded with the musical pipings of thousands of frogs.

We pushed onward through this picturesque scene for nearly a mile, over waters teeming with fishes of varied hues; then the stream narrowed and we paused for a time before turning back. While here our attention was attracted by a bird that resembled a Marsh Hawk, sailing low down over the grass, and as it approached us, we perceived that it held a round object in its talons. It drew nearer and finally settled on a magnolia bush a few rods away, when I saw it was a bird new to me and I instantly shot at it but without effect. It rose and flew away and I anxiously watched it as it hawked about the marsh after the manner of our common Harrier. Then it dropped upon something and returned to its former perch with its prey which was a round object similar to the first, when I once more fired, but only succeeded in loosening a few feathers, for the bird got up leisurely and went in search of more game apparently unharmed. It soon returned again but was shy of the bush and would not settle; thus I was obliged to shoot at it on the wing but unaccountably missed it a third time. Thinking, no doubt, that we were in earnest it then flew away and did not return, although we waited a long time for it.

We then turned homeward somewhat disappointed, darted down the rapids with the speed of an arrow and reached the bottom without accident. As I had seen but a single Kite I concluded that some accident had brought it to the Everglades at that time and that I should see no more of it. This hypothesis was in a measure confirmed by my visiting the locality afterward without seeing it.

On the first of March I entered the Everglades, accompanied by Mr. Henshaw; then we were in search of Anhingas, and as they were very shy and difficult to procure, I concluded to use strategem to get a shot at them.

Therefore my companion landed me in a small cypress island to the right of the main stream, where I concealed myself beneath a tree that was thickly hung with long streamers of Spanish Moss. My companion then rowed up the river for the purpose of driving the Snake Birds down and as they were accustomed to alight on the trees on the island, they would be within range of my gun. After a time several came down as expected, and I had killed one when I heard the report of my friend's gun. I had wondered what he had killed when he appeared with a beaming countenance.

He pushed the prow of the skiff into the reeds that grew at my feet and in reply to my question "What have you got?" held up a Kite that I recognized at once as the same species that I had vainly endeavored to obtain upon a former visit to this place. It was an adult male and Mr. Henshaw stated that he had seen another.

Upon hearing this the Anhingas were forgotten and leaping into the boat we pushed off. As we approached the spot where I had seen the bird before we perceived one sitting on a bush. By carefully pushing along the marshy banks of the tortuous stream under cover of the high grass, we came within gunshot, and a second Kite was given its death struggle in the top of the bush. Just at this moment we saw another coming, and its attention being attracted by the motions of the one already shot, it

hovered over it a moment, then as it received a charge of shot sailed gracefully downward and fell in the dense grass only a short distance from us.

I immediately left the boat, entered the grass, sinking to my knees in water and thus easily secured the first Kite that proved to be another adult male. The second required a longer search and I experienced considerable difficulty in making my way through the dense growth of grass upon such an insecure footing, for the bottom was not only submerged but also quite spongy. After a time, however, I found the Kite, and was turning to go back when I discovered a partly completed nest a short distance from me that was without doubt owned by one of the birds just killed. It was small, flat in form, composed of sticks somewhat carelessly arranged, and was placed on the top of the grass which supported it and which grew so luxuriantly at this point that it bore me up as I was endeavoring to reach the nest.

Although disappointed at not obtaining eggs, we were much pleased at having procured three birds, the last of which proved to be a young male.

The 24th of March found Mr. Henshaw and myself once more in the Everglades searching for Kites. We had killed two males and a female, when upon picking up the latter I found she was incubating. Before shooting her she had behaved strangely, and I was certain she had eggs near, therefore I commenced a long, systematic search during which time I was obliged to exercise great caution to avoid treading upon water moccasons, for they were very abundant, but at last I discovered the nest in a mag-

nolia bush. It was placed about four feet from the water, was quite flat, about a foot in diameter, was composed of sticks quite carelessly arranged, lined with a few dry heads of saw grass and contained one egg. Upon dissecting the female we found an egg just ready to be laid, but unspotted, being blue in color throughout.

Previous to this we had become acquainted with the Seminoles. The knowledge which these people possess of Natural History is surprising, inasmuch as they probably never saw a naturalist and if they had would not have learned much from him, for they speak but little English. Among those particularly noticeable was Tiger Tail, the son of Arenameed chief by the same name, who so bravely withstood the whites during the last Seminole wars. Tiger, as we familiarly called him, was a stalwart, finely formed man, about thirty years of age, with a handsome, expressive countenance and bright, intelligent-looking eyes. Besides being a man of influence in his tribe he was a fine hunter and his wigwam never lacked venison. He not only knew the different mammals of the country but also readily distinguished and named the various species of birds that we showed him. Every one, excepting a few of the smaller Warblers that only winter in Florida, had its Seminole name. Even insects were known by particular appellations, and Tiger has frequently showed me the chrysalis of some butterfly or moth and afterwards pointed out in my collection the species that came from it.

The Everglade Kite was at once recognized as so-far-fun-i-car and its place of residence said to be Pi-i-o-hee.

We explained to Tiger that we were anxious to procure so-far-fun-i-car sas-ta-kar (Kites' eggs) and he promised to look out for them. The other Indians, who visited us and exhibited much interest in our pursuits, were also made to understand that we wanted eggs.

After discovering the nest, as narrated, we were slowly returning home-wards, when we perceived a Black-necked Stilt standing on the margin of the river, near the rapids. We shot at it and as the report of our guns rang out we heard the friendly whoop of an Indian. We were accustomed to this cry and immediately answered it, then turning in the direction from whence the sound came we saw a canoe containing the lithe form of a Seminole glide out from a neighboring cypress swamp and as he came rapidly nearer we recognized Billy, son-in-law of the old chief Ellick. When he came near enough for us to discern his face we saw that he had something to tell. He pushed up and we exchanged the usual salutations. After this I showed him our precious nest and egg and explained where we had found them; then asked if he could procure any like them. He listened gravely until I had finished and then said simply, "Me got um." "What?" we both exclaimed. "So-far-fun-i-car sas-ta-kar" he quietly answered. "Where?" we asked. Billy said nothing but led the way to the bow of his canoe and pointed to an old tin dipper. We looked into it and saw two Everglade Kite eggs lying in the bottom. It may be assumed that I was not long in transferring them to a safer place, while my companion gave vent to his delight in some whoops and a

dance which caused the Indian to gaze at him in speechless admiration. Billy said that he found the two eggs placed in a nest built in a bush. The next day Tiger also brought me two eggs from a nest which was built in a similar situation.

I think two eggs are the usual number laid by this bird, for in three instances no more were found, and in the last eggs the embryos were considerably advanced. I also questioned the Indians concerning it and they said that two were all the birds ever laid. The Everglade Kites appear to be very irregular in the time of depositing their eggs as may be seen from the preceding account. This species is, unlike most other Kite Hawks, very sociable in its habits and I have frequently seen six or eight specimens at one time flying over the marshes in company or sitting together on the bushes. In flight they resemble the common Marsh Hawk and as they are unsuspicious they may be approached quite readily.

I have remarked that the first Everglade Kite I saw was carrying a round object in its talons, and afterwards I frequently saw others doing the same thing. What these objects were was explained upon dissecting the specimens taken, for all their stomachs contained the animal of a species of fresh water shell. This shell (*Pomus depressa* of Say), which was only a few years ago considered quite rare, appears to be restricted to the fresh waters of Florida where it abounds. It is round in form, about two inches in diameter and dark, glossy green in color. I observed empty shells floating on the waters of the Everglades long before I had the slightest idea they

were cleaned by the Kites, but after I dissected the birds I searched around the bushes where they roosted and found the shells scattered around quite abundantly. The Indians call it Shal-ly-bung-kar.

Shortly after our first visit to the Everglades bunches of eggs about the size of those of the Hummingbird began to appear on the stalks of the saw grass. They increased in numbers rapidly until there were millions of them. I could not imagine what they were until Tiger informed me that they were Shal-ly-bung-kar sas-ta-kar (*Pomus depressa* egg).

Although the Kites subsisted entirely upon the animals contained in these shells and appeared to find them readily I never saw a single living specimen. I have however found them on the Indian Hunting Grounds when freshly killed by a fire which spread over a dryer portion of the Glades.

The talons of the Everglade Kite are curved just enough to grasp the shell readily and its long, abruptly curved upper mandible is peculiarly fitted for removing the animal and it is not uncommon to find specimens of the shell with a hole punched in the side by this hook.

I have never met with this bird except in the marshes of the Everglades where it resides throughout the year, but it also occurs in all the fresh water marshes of middle and southern Florida.

The eggs are rather oval in form, bluish white in color, spotted and blotched irregularly with brown and umber of varying shades. Dimensions from 1.40×1.55 to 1.55×1.76 .

Lobster Hatching at the Woods Holl, Mass., Station of the U. S. F. C.

By C. C. PURDUM.

Aside from the numerous interesting geographical peculiarities, and facilities for the study of natural objects, especially in the absorbingly interesting line of marine work, at Wood's Holl, the chief interest centers about the head quarters and fish-hatching station of the United States Fish Commission.

The station consists of the principal buildings: the residence, home of Commissioner McDonald and corps of assistants during the summer months, a large power house by which is run the dynamo supplying the station with electricity. In this building is also the heavy pump which keep a constant stream of salt water passing through the aquaria, etc.

But the most interesting and instructive part of the station, by far, is the laboratory and fish-hatching house, in which as its name implies, are conducted the investigation and hatching operations, together with the extensive marine collection.

The hatching room takes up the greater part of the ground floor and is supplied with an abundance of pipes, etc., for the conveyance of the water used in the hatching process.

Situated along the walks are the numerous "hatching boxes" for the hatching of the young cod fish—but of this in a later paper—and which during the lobster hatching season contain the "hatching jars" for the lobster eggs.

The eggs are deposited by the female about the 1st to the 10th or 15th of August and are held close to the

wider surface of the tail, at the junction of the bony plates, by a gelatinous substance.

After being deposited in their situation they remain and do not develop *at all* until about the middle of March, when they begin to show some development and then the process goes on quite rapidly.

Among the "tender morsels" prized by some fishes for a meal (and especially the common Tantoy (*Tantogonusitus*) and common eel (*Anguilla vulgaris*) the eggs of the lobster form a prominent part. The eels get below the lobster and by their movements detach the eggs and then devour them. This causes, of course, a great diminution in the number of lobsters, and to prevent it the Government has instituted the above enterprise.

The process is as follows: About the middle of March all the "egg lobsters" that can be procured are taken. The eggs are gently removed and the eggs from three lobsters, viz about 24,000 placed in the small jars which is supplied with water through a tube. When the water has risen to the proper level the excess is carried off by a siphon tube into the large jar which is covered by a fine netting or cheesecloth through which the overflow of water escapes when the jar becomes filled.

When the eggs are placed in the small jar they are constantly kept in motion by the current of water flowing in and out of the tubes but being much heavier than the water, they remain at the bottom of the jar.

As already stated, the development of the eggs goes on quite rapidly when once started, so that by the end of four weeks after their introduction to

the jar the young lobsters have "hatched" and immediately *rise to the top of the water*. They are then carried, of course, by the tube into the larger jar where the fine wire netting or cheesecloth keeps them from overflowing.

The young lobsters remain in this jar for about two weeks, when they have attained sufficient size, and are consigned to the tender mercies of "mother ocean" either to "pursue the even tenor of their ways," or to furnish a meal for some festive bass.

During the season 1893-94 this station liberated 100,000,000 young lobsters. This number was greatly in excess of previous years; the largest number liberated previously, being 70,000,000. The average number liberated, however, being about 55,000,000.

Should this article by any chance escape the editor's waste basket, I will endeavor at a future date to describe the operation of cod-fish hatching at this station.

Occurrence of Nickel Ore at Keokuk, Ia.

For the MUSEUM.

In the great laboratory of Nature, forces always are and have been busy in converting, but not creating; which, in fact, is a power that has not been delegated to lifeless matter. We become so accustomed by experience to expect great results from the operation of prodigious force, that we do not wonder in seeing great metallic wealth stored up in the mountain's embrace, where the prodigious force of mountain making, in the way of dislocation, pressure, and heat, has been at work; but we feel some surprise when we see

a fertile surface soil, capable of supporting a teeming population, floored by strata of ordinary limestone rock as evenly and regularly laid down as the covering of a well prepared bed. Such are the conditions, however, under which the Nickel Ore, called Millerite, occurs at Keokuk, Iowa.

At the Southern extremity of the city, and beneath a precipitous ledge of limestone rock, facing the Mississippi river, is one strata in the ledge, 5 or 6 feet thick, of hard, flinty limestone, having here and there geodetic cavities which are often lined by beautiful calcite crystals; among and through which sometimes shoot the most beautiful capillary and needle crystals of the Nickel Sulphide, called Millerite,—sometimes like a mass of cobweb fibers—sometimes a pencil of radiating needle crystals—sometimes penetrating the calcite crystals—but always redolent with splendor. Occasionally, there are nodules of it scattered here and there through the more impure limestone.

It will not likely ever prove a valuable source of Nickel in this locality. The thinness of the strata in which it occurs—the fact that in going South it soon comes to the surface, while in other direction it dips beneath the river, the scantiness of the cavities in which it occurs, and the almost phantom form of its crystals,—all forbid that, and especially when we remember that the production of Nickel from its ores is both tedious and expensive; and that the value of the pure metal does not often much exceed one dollar per pound.

But are we never paid for anything the possession of which does not add dollars to our bank account. There

is here an appeal to the eye that may better the heart.

In the illimitable ages of the past,—we know not when,—but, at all events, while the Stone Lillies were carpeting the quiet sea with their growth, and many species of Shark were disporting in the water, there was, even then, the pencil and engraving tool, guided by the Invisible and Divine Hand, at work in these silent recesses, to paint and hew.

While there is nothing very strange in the occurrence of this mineral here, because the geographical distribution of the Nickel ores is rather general, there are still some things to note. Not only in ones own Country but also in foreign localities, Nickel is very apt to occur with Chrome ore. And both in connection with Serpentine rock. It does not occur so here. Nor, except some Magnesian limestone in places, is there any rock akin in Chemical constitution, in lots or in part, to Serpentine. And certainly Chromium is wanting, though the Sulphide of Iron and Copper are, in some places, present in sufficient quantity to give irised coloring to the Calcite. It is to be noted all these metals occur as Sulphides, and hence changed from their primitive condition and brought to this state by the deoxidizing action of decaying animal matter, which was abundant at that age, if we may judge from the fossil remains. Lacking the association of the Chromite and Serpentine rocks of other localities, however, it stands alone here as the only Nickel ore unaccompanied by "Emerald Nickel," which seems to result from infiltration under such circumstances.

GEO. M. CROFTS,
Summitville, Iowa.

The Collection and Preservation of Marine Invertebrates.

CLASSIFICATION.

The animals inhabiting the sea, excluding the fishes and other vertebrates, may be divided, for convenience, into groups, as follows: 1st Crustaceans, including crabs, hermit or soldier crabs, lobsters, *langoustes*, cray-fish, *camerones*, shrimps, prawns, sand-hoppers, beach-fleas, whale-lice, sea-creepers, pill-balls, fish-lice, sea-spiders, water-fleas, gill-suckers, and other parasites on fish, also barnacles. 2d. Annelids, including all kinds of sea-worms, some of which hide among seaweed and pebbles, but most of which live in mud or sand, many having tubes. 3d. Cephalopods, or cuttle-fishes and squids. 4th. Naked Molluscs, or sea-slugs. 5th. Shells, both bivalve and univalve. 6th. Tunicates, vulgarly called "sea-squirts," consisting simply of leathery balls or sacks of various shapes, with two apertures, often occurring in compound forms. 7th. Bryozoans, or those minute coral-like incrustations found on seaweeds, stones, and old shells. 8th. Holothurians, those worm-like or slug-like echinoderms like the bichele-mer or trepang. 9th. Echini, sea-eggs or sea-urchins, most of which resemble chestnut burrs, being covered with spines. 10th. Asterias and star-fish of all kind. 11th Polyps, including corals and corallines, and those minute animals from which the medusæ are developed. And 12th. Sponges.

LOCALITIES AND STATIONS.

Where the retreat of the tide is sufficient, the sea-shore always affords the best field for the collector, and the

specimens generally increase in number and interest in proportion as we approximate to low-water-mark. Nevertheless the whole area should be searched, as each species has its peculiar range, and many forms can live only where they are exposed to the air for a greater part of the time each day. The ground may be either muddy, sandy, weedy, gravelly, stoney or rocky, and the animals inhabiting each kind of ground will be found to be more or less peculiar to it, and rarely to occur on the others. *Sand* and *mud* are, however, so similar in character that their denizens are nearly the same, though some prefer the clearer waters which flow over sand, to the turbid tide which deposits mud. But few specimens will be found on the surface of such ground, although the little pools lying upon it should be scooped with the dip net for shrimps, etc., but it is only by the spade that its true riches can be developed. By digging in spots indicated by small holes, a great number of worms, boring crustaceans, and bivalves may always be found. *Weedy ground* is so called from the abundance of eel-grass and sea-weed which covers it. These weeds should be examined carefully for small shells and crustaceans; perhaps the best method of doing this being to wash quantities of the weed in a bucket of water and examine the sediment. *Gravelly ground* is not generally very rich in animal life, but will repay an examination, as small crabs are fond of lurking among the pebbles. *Stoney ground* is by far the richest of all. Wherever there are stones, particularly flat ones, about large enough to afford a moderate degree of exercise to common sized man

in turning them over, there the zoologist can never fail to fill his basket and bottles; for beneath these stones myriads of rare and beautiful species retire for moisture and protection during the retreat of the tide. *Rocky ground* should be searched chiefly in the pools and crevices.

Littoral or sea-shore investigations should be carried on not only in the bays, harbors, and creeks, but on the ocean beach, in each locality, to get at a true idea of its fauna, as the respective animals will be found different.

For shore collecting, a broad, flat basket, with jars or tin cans, of various sizes, for the smaller and more delicate animals, which should be brought home in sea water. A spade, trowel, and a strong knife for detaching limpets and tunicates from the rocks. A small dip-net is quite indispensable.

PRESERVATION OF SPECIMENS.

Alcoholic fluid is the only medium in which marine invertebrates can be properly preserved, shells and corals alone being excepted. Dried specimens are always in danger from dampness and breakage, and when sent to the Museum, seldom reach their destination uninjured. In placing the specimens in kegs, cans, jars or bottles, a few rules should be carefully observed: 1st. Never crowd them too much; a bottle should be not more than half filled with specimens, but must be always entirely filled with alcohol. 2d. Adapt the bottles to the size of the specimens, placing small ones in small bottles, or, if very minute, in homœopathic vials. 3d. Never put soft and delicate forms with hard or spinous ones, which would injure them in any agitation. Each jar or

bottle should contain specimens from one locality and station, which should be indicated in full on the label—the nature of the ground, distance from low water mark, and, if dredged, the depth of water being noted. In the larger kegs or cans, if specimens from more than one locality are included, each should have a parchment label attached, with the notes written in ink.

Collecting in the Rockies.

MAY 4, 1895.

Editor of the Museum:

A great many of the readers of this interesting magazine will no doubt remember seeing my name on several occasions, wishing mail to be sent to different parts of the United States.

I am at present located 150 miles from the railroad in a valley known as Jackson's Hole, on the east side of the Teton range of mountains. The snow is still deep on the summit of the mountains and the three grand Tetons loom high above the surrounding peaks.

This is the greatest game country in the United States at present and will continue to be for some time to come. Birds are very common. Sage Grouse, Columbian Sharp Tail, Gray Ruffed and Blue can be found anywhere but the Gray Ruffed and Blue will be found high up in the mountains, while the Sage and Sharp Ta prefer the sage plains. Ducks, Geese and Sand Hill Cranes are very common. The Warblers are just beginning to arrive and every bush is filled with the spry little fellows busily engaged hunting their food.

Yesterday while out hunting I went

through a place known as the Hole in the Wall. High upon a cliff I could plainly see a nest resting on a shelf of the cliff. As I approached a Raven left the nest. I tried to climb to it but after repeatedly trying both from above and below I had to give it up as a bad job, although I was within a few feet of the nest. It contained young as I could hear them continually calling. On my way home I found a Rough-Leg Hawk's nest which contained one egg, but left it for the complete set. A large bunch of Antelope was on the Lick but as I approached they withdrew to the hills. Elk are very common and can be seen every day from the cabin door. Large herds pass within a short distance of the corral on their way up to the National Park. They have all shed their antlers and new ones are now growing. The new horns are very tender and while in the velvet if they get bruised they will bleed and often grow in queer shapes. Large antlers can be found lying everywhere on the mountains.

The Western Porcupine is very abundant and frequently found in the hills. They are very large, often weighing 30 pounds. Will not run away from a person but stand and prepare for an attack. Nothing cares to bother them as the quills are very sharp and if you touch the animal you will feel several points. They are very pretty and odd. Ground Squirrels can be seen at all times and their continuous chatter is constantly heard on the hills and sage plains. The Badger is with us in considerable numbers.

The Black, Grizzley, Cinnamon and Brown Bear is found all through the mountains, and several are trapped every year. There is one animal I

have not yet had the pleasure of seeing and that is the Cooney, or Little Chief Hare. They are common in some places in the mountains, but are only found in the loose rocks above timber line. Old hunters tell me where I can find them, and I will be sure to get some of the little fellows. The greatest trouble in collecting them is getting up where they are. I will have to close as it is nearing dinner time and I can smell the Antelope steak frying.

NATHAN L. DAVIS.
Jackson's Hole, Wyo.

A Fishery Exhibit.

A permanent piscatorial and sea-shell exhibition has been opened at Gloucester, says the *Fishing Gazette*. The collection was exhibited at Chicago during the World's Fair, and attracted a great deal of attention.

The dedication day was quite an eventful occasion with the Boston fish merchants and fishermen who were present and participated in the ceremonies.

The exhibit comprises every specimen of the finny tribe and implement known to the American fisherman. In addition to preserved specimens of fish, there will be on exhibition a large number of oil and water colors, illustrating every feature known to fishing, from the time that vessels leave Gloucester until their return and entry into Boston harbor loaded with fish; likewise views of vessels arriving in the harbor in the winter months covered with ice, and illustrations demonstrating river and lake fishing, and game fish in all waters. Model houses or curing, dressing and packing fish, are especially interesting.

The exhibit is certain to become popular, being as it is a practical project, meant to perpetuate an American industry that represents a value of more than \$40,000,000 a year, and gives employment to over 175,000 men, 6,400 deep water vessels.

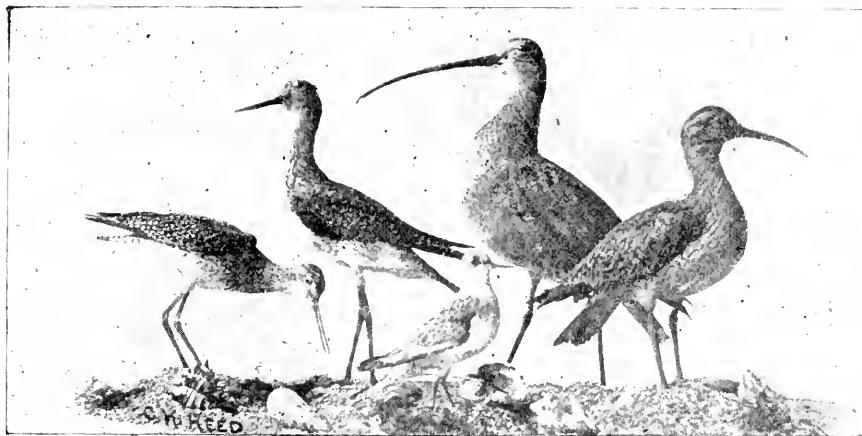
A great deal has been said of late about the so called "missing link" found by Dr. Eugene Dubois of the Dutch army in the early pleistocene strata of Java. The type of the skeleton is between the human and the monkey. One swallow never makes a summer, and one imperfect skull never should be taken as typical of a period. Had a dozen such turned up and all of a common type, there would have been more reason for accepting it as characteristic. Of course the fact that successive finds, and at remote points like that of Neanderthal and this of Java, are all of low type, is exceedingly suggestive. It is not, however, wise to be too sure of the meaning of such data just yet.—*Popular Science News*.

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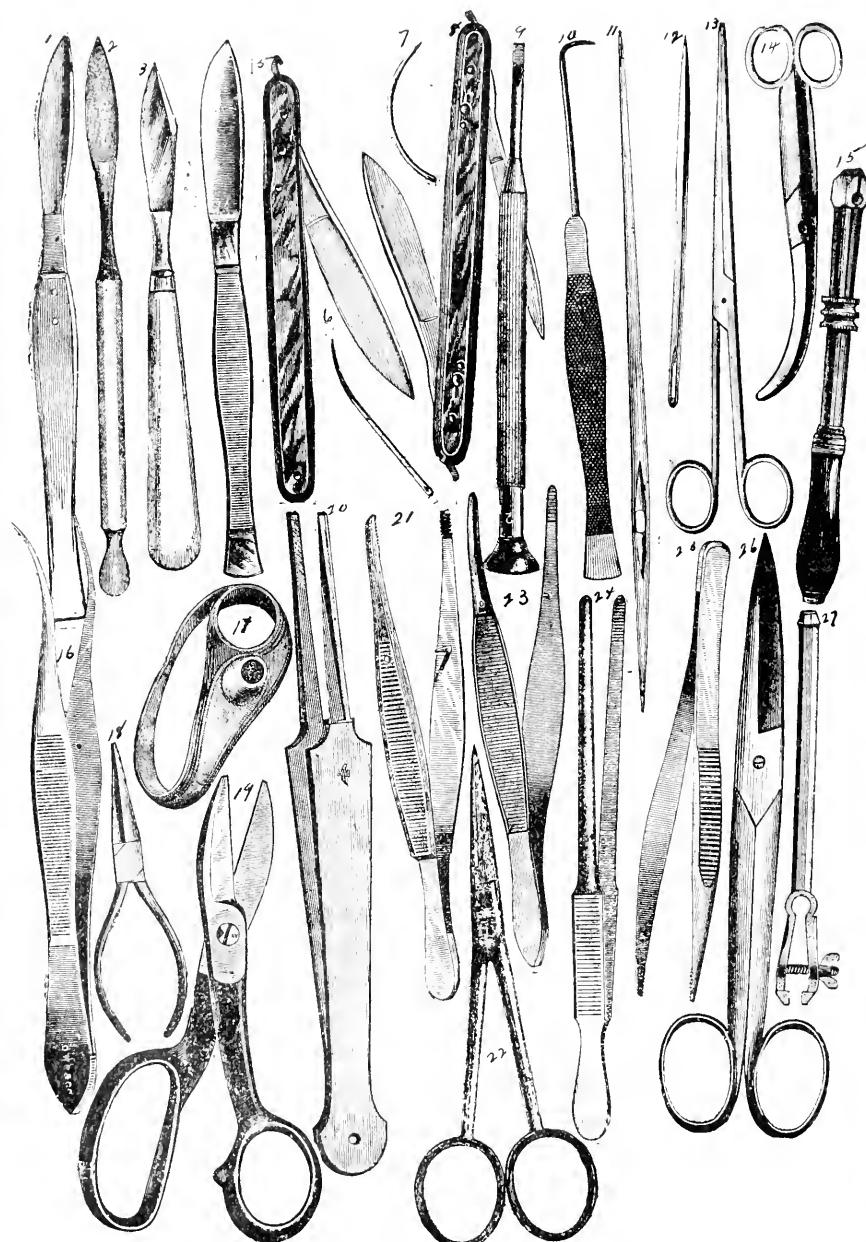
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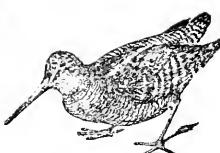
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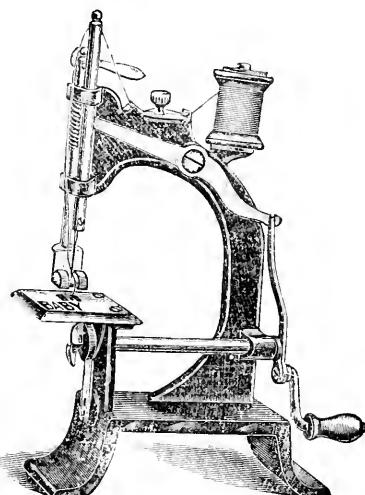
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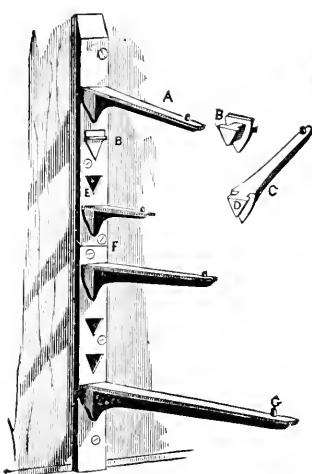
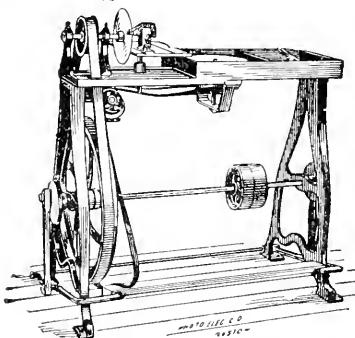


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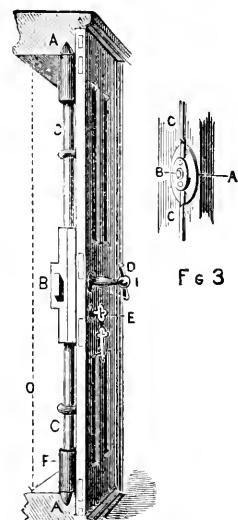


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VOL. I.

NO. 9

JULY, 1895.

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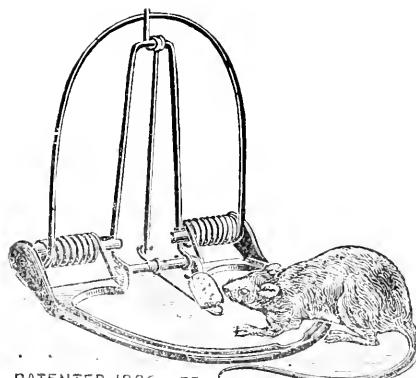
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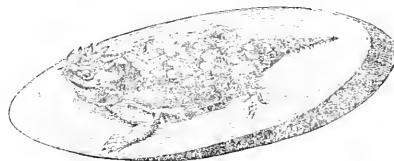
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The Cosmopolitan.

"O, will he paint me the way I want.
As bonny as a girlie,
Or will he paint me an ugly tyke,
And be d—d to Mr. Nerl!
But still and on and which ever it is,
He is a canty Kerlie.
The Lord protect the back and neck
Of honest Mr. Nerl."

This, one of the last verses ever written by Robert Louis Stevenson, is in reference to the portrait of himself, which is given to the public with his verse for the first time in the July *Cosmopolitan*. The lines might have come from the pen of Burns, and are inimitable in their way. The portrait was declared by Stevenson himself to be the best ever painted of him. In this same number of the *Cosmopolitan* Rudyard Kipling tells an Indian story, to which Remington adds charming illustrations; Mrs. Burton Harrison makes a serious study of New York society in "The Myth of the Four Hundred," and Kate Douglass Wiggin contributes a story of one of the most delightful of Welsh retreats. The *Cosmopolitan* was with this number reduced to ten cents per copy, and as a consequence, notwithstanding its large edition, it was "out of print" on the third day of publication.

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THE MUSEUM.

A Monthly Magazine Devoted to Research in Natural Science.

VOL. I.

ALBION, N. Y., JULY 15, 1895.

No. 9

Among the Rockies.

BY MORTON J. ELROD.

III.

One of the most delightful camps in my life was a ten days' tenting at Seven Oaks, 18 miles from Manitou, Col., up the Bear Creek canon road. This being my first visit to the Rockies everything seems more vivid and distinct than on other occasions. Three of us, all pedagogues, took advantage of a low rate to take an outing and collect. A rig was leased, at the usual good figure, an abundance of provisions piled in, as we thought, we followed the tortuous road slowly up the gorge, the high cliffs frowning on every side, with frequently a deep gorge down which the clear stream dashed in its mad haste to make the descent, in marked contrast to our toilsome ascent, since we had a grass fed pony just from the pasture, and a boiling sun. It is a romantic road. Many little parks are passed, delightful places for a naturalist to spend the summer, and here and there was a neat summer cottage, though all were apparently untenanted.

Our camp at Seven Lakes was pitched at an altitude of 11500 ft., about 500 ft. below timber line. Although it was the last of July, ice froze nearly every night of our stay, and rain fell nearly every day, much to our discomfiture, making collecting very unprofitable. We had a delightful place. Northward some six or

seven miles the bald summit of Pike's Peak was plainly visible. The trains could be seen toiling up the mountain side at a snail's rate, and the whistle when sounded would echo and re-echo among the mountains until lost in the distance as the sound waves moved onward. To the south was the pass through the mountains leading to the mines at Cripple Creek. Southeastward, a mile or so from camp, the steep sides of Old Baldy were clothed in green with a dense growth of pines, while above them his bare and rocky sunmit tempted us daily to an ascent. Camp was on the bank of the second lake. The first lake is at the base of the mountain Old Baldy, fed by snows from its sides in spring and summer. It is clear as crystal, cold as ice, no one knows how deep, and covers thirty-five acres. Nestling at the base of this great mountain, it looks small in comparison, and its size is not appreciated until one walks around it. On the bank of the lake is a so-called hotel, built of logs in the old fashioned way, with a great fireplace, which was very pleasant to sit by after climbing until one's legs ached and one was wet to she skin. Close to our camp on the east was a growth of pine with trees and fallen timber so dense and matted that I don't see how any four-footed animal could get through, but it is presumed they do.

Here, amid such surroundings, with a few books, plenty of fuel, and a fair supply of victuals, we sat or climbed

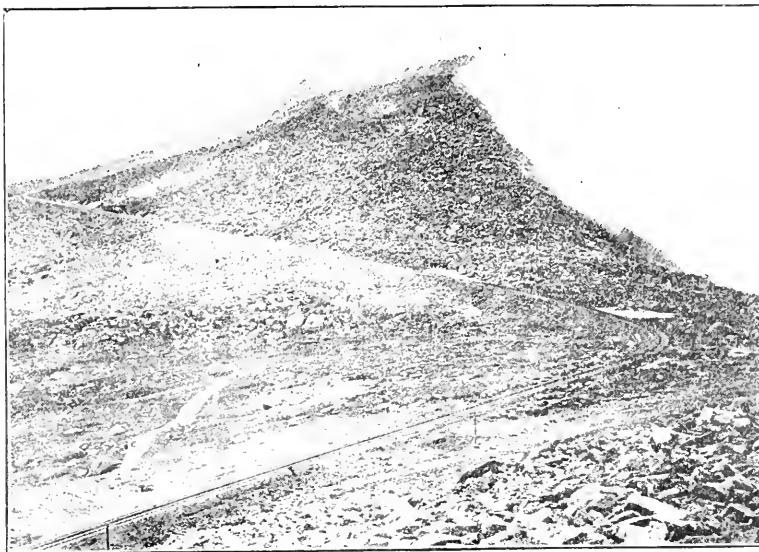
or slept or caught insects as we pleased. From the way our limbs ached each night it may readily be guessed how the time was spent.

A few remarks on the effects from the high altitude. To sit or lie is a great comfort; but the least exertion is fatiguing. To fetch a bucket of water for breakfast was a task and made one pant for breath. To collect firewood was almost as bad, while to chase butterflies or follow up a bird was almost an impossibility. If they came by all right they were likely our meat; but if not they were safe. Gradually one gets accustomed to it, but it is always fatiguing work; and the fellow who plans to travel like he does on the level plains of Illinois will find his number of miles traveled not very extensive when night comes. Usually we were much swollen on arising, and it was often with difficulty that we put on shoes. But such things are of little moment. It is impossible to have everything to the taste.

Birds were not very numerous, yet during our stay a number were taken. They seemed wary and were hard to get. For the first time I saw the beautiful Red-shafted Flicker, *Colaptes Cafer*. A single flock, and they seemed to flock, was observed, and chase made. I followed for two hours, trying in vain to get near enough for a shot. They finally flew over camp, and one of the boys who didn't care a rap for a bird seized a gun, bagged one, and then wouldn't trade, give or sell it. As the grass was wet and rain falling it was good on the temper to dry out while the Flicker was being skinned. It was a pure Redshaft, showing no indications of being a hybrid.

Blue birds were more plentiful and their mournful note was frequently heard, and several were taken. The camp robber, Clarke's Crow, *Picicorvus columbianus*, was a frequent visitor near camp and several fine specimens were secured. I must here express my amazement on one occasion. A bird was heard at a distance making a great racket. I was sure I had something new. I cannot say what the noise or call was like, but it was kept up until I got close enough for a shot. As this was in the aforementioned forest it took some little time to do this, and on picking up the specimen it was found to be a camp robber. They are good fliers and are found on the highest parts of the mountains. They are frequently in numbers on the craggy sides of Pike's Peak far above timber line. The Blue Crow *Cyanoccephalus cyanoccephalus*, was also seen, and a couple added to our stock. It took a good deal of courage to shoot one of the famous Ouzels, and its loud cry of alarm still sounds in my ears as it dashed into the water to escape. Alas, the aim was too true and it fell, but I had wished it might escape.

Some Ravens were occasionally seen soaring overhead, once we saw a Western Jay—when we didn't have a gun—and several times Magpies were having a noisy time not far off, but they were too wary. A flock of the huge Spruce Grouse, *Dendragapus canadensis*, were stumbled upon one day, and not only added a skin to our collection, but a single specimen made a good mess, considering the way our victuals were going. Far up on Pike's Peak, above the saddle back on the



Pikes Peak, showing the home of the Pica.

railroad, some small bird was seen. It looked much like a Finch. Having nothing but large shot it was useless to shoot, and another unknown is added to the list.

One of our most interesting catches was the taking of a number of the so-called water dogs of the lakes. They are not water dogs, but are the larva of *Amblystoma tigrinum* Green, which has figured in various texts as *Siridon lichenoides* or *Siridon gracilis*. This little batrachian has an interesting history. In the adult stage it has received 23 different names from different naturalists, while the larval stage has five names, and was for a long time considered a separate animal that did not undergo metamorphosis. There are six color varieties, five series of palatines and four different types based on unequal development of parts. (Batrachia of North America, Cope, 1889.) It has been collected in nearly every state in the United States, from Mexico and Can-

ada, and the larva is found in still water all over the Rocky Mountains in abundance. It transforms late in the summer, but as few of those in high altitudes were ever seen and none were formerly known to transform, it was believed that they always remained in the larval stage. They are rapacious, eating animal food and taking the hook readily. At the time of our arrival at Manitou they had already left the water and some had entered the adult state. These were observed at the lake near Colorado Springs, and the specimens seemed lighter in color than those in the mountains. They terrify the people near the water who could not be hired to go near them. It was the same with those in the mountains. The man who had for years lived near this lake at the base of Old Baldy had never touched one, and would not do so. It is said they do not inhabit all of the seven lakes but this is likely a mistake. They go in schools or droves in the large

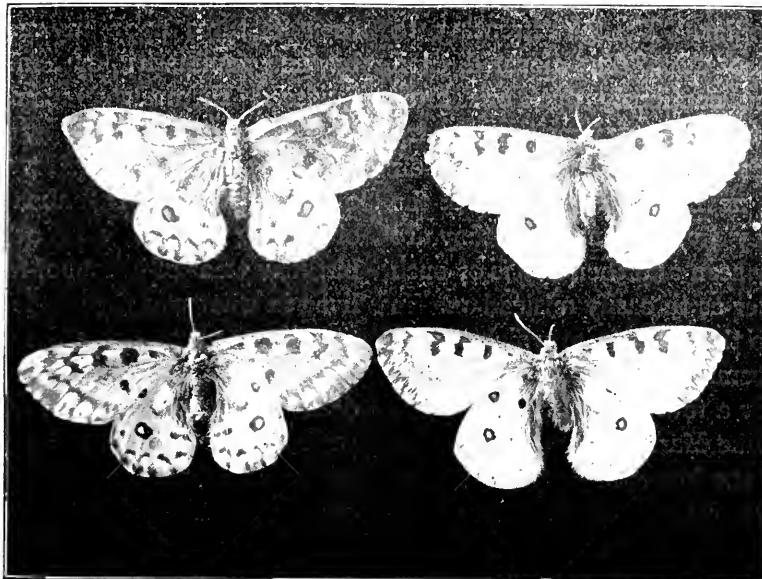
lake, and are seen by the thousands. At night they seek the deep water, and a good portion of the day is spent in the shallow water at the edge, evidently seeking food. It is said there are no fish where they are so abundant, but as to the truth of this I cannot say. Undoubtedly great numbers of them would clean out the fish food from a body of water.

It was fun catching them. I started alone with an insect net and a fruit basket. Taylor had said to be sure and bring him one. There were thousands of them, piling over each other, several deep, along the bottom, as visible as clearly as though there was no water. They would not come close enough to the edge to be taken in the net. An old raft was near, but I couldn't tow it and seine. The water looked so shallow I decided on a plunge and in I went, with a whoop however for it was ice cold and waist deep. It is a wonder it was not over my head, everything in the mountains is so deceiving. I think I can appreciate what travelers mean when they say they had to wade a torrent on a glacier. But it was done, and the basket might as well be filled and it was filled. As I came into camp wet and bedraggled, with a woe-begone look, I said, "Taylor, I couldn't get but one." "Well, never mind, we will try it again," he said. Later hearing a squirming and stirring he looked over at the basket as he stirred the mush, stopped, and remarked, "Well, I'll be—" He did not finish. Some hot mush flew out on his hand and he busied himself for a few minutes. He says that axolotl he has is the greatest curiosity in his county. If any of the MUSEUM readers want a specimen I have some yet.

In insects there were plenty of flies but as I know little about them I cannot tell of what species. There were no mosquitoes, no dragon-flies, no mayflies, only an occasional beetle, but plenty of butterflies. Our camp was right in the home of *Parnassius smintheus*, and they could be seen by the thousands. But the weather was bad and as soon as the sun was behind a cloud they disappeared. My collection shows a good series with many variations in color and marking. This beautiful specimen was sought constantly during the sunshine. Most of them have been traded and I sigh to again visit them at home and see them as thick as before.

With *Parnassius smintheus* were taken in abundance *Satyrus alope*. On the bald sides of Pike's Peak *Coli-as meadii* and *ochraceus* were now and then resting on the *Polygonum*, *Gotentilla*, *Silene* and *Geum*. When seen, however, we were after the Pika and a breathless chase with a hat brought a few that are now very highly prized. Other butterflies taken are given in the April number of the MUSEUM.

We made several trips to the saddle back; two miles from the summit, for the peculiar tailless rodent, the North American Pika. This interesting and peculiar animal was met with frequently and in numbers in the earlier surveys of the west, and has received no little attention at the hands of naturalists. It generally stays about timber line, but is frequently met with lower. Aside from those taken on this occasion I shot a single specimen below timber line at Mt. Lou Lou, Mont., whose skull is now in the Smithsonian.



Parnassius smintheus.

The Little Chief Hare or Rocky Mountain Pika, (*Lagomys princeps*), was described by Dr. Richardson in 1829 (*Fauna Boreali-Americanæ*), from a specimen collected near the south branch of the Mackenzie, considerably north of the United States boundary. It ranges southward along the summits of the Rocky Mountains, increasing its altitude with decrease in latitude. In Colorado it is never found below timber line. Only one species was recognized in the United States prior to 1889, when Dr. C. Hart Merriam described another species from the Sierra Nevada mountains in California, (*North American Fauna No. 2*). Dr. J. A. Allen gives generic and specific descriptions of *Lagomys princeps*, (*Monographs of North American Rodentia, 1877*). They range much in size and color, irrespective of age, sex, season or locality. Above they are

grayish-brown, varied with black and yellowish-brown; sides yellowish-brown; below grayish, more or less strongly tinged with pale yellowish-brown. They are nearly tailless, have five toes in front and four behind, armed with short, arched, compressed nails, with a prominent, naked pad at the base of each toe. They range in length from 6.5 inches to 8 inches, averaging about 7. Ears large, broad, rounded. Whiskers numerous and long (1 in. to 2.5 in.) They are found very abundant in many places in the Rocky Mountains.

Concerning the habits of the animal Dr. Allen says (*Op. cit.*), "Their habits seem everywhere much the same. The animals are everywhere found in communities, living among the loose rocks from a little below timber-line nearly up to the snow-line. They appear to rarely wander from

their homes, are timid, yet easily become familiar. Though retreating to their holes when first alarmed, then soon come cautiously out, one after another, till one may hear their sharp little cries in every direction. Their color so nearly resembles that of the rocks they live among that they are not easily seen and their cry is of such a character as to easily mislead one in respect to the point from which it proceeds, seeming to be far away when really only a few feet distant. They sit erect like Marmots, and in no way resemble the Hares in habits. They carry into fissures of the rocks large quantities of grass, which they lay up for winter consumption. They are weak, sedentary animals, and are apparently strictly diurnal in their habits."

The Pikas, living and fossil, are all traceable to a single genus, *Lagomys*, with eight species, found only in Western North America and Northern Asia. Two species are found in North America, three in the elevated parts of Northern India, and three others farther northward. Formerly they extended much farther southward and westward; their fossil remains having been found in the Pliocene strata of England, France and one of the islands of Corsica and Sardinia, (Op. cit.). They represent an ancient family, being a less specialized form than the Hares.

Changes in Land and Sea.

A short time ago I paid a visit to the place of my birth—Hull, an old seaport in Yorkshire, in the north of England; when there I felt most anxious to again see some of those spots

which in early boyhood had impressed their features upon my memory, and by their familiarity or some incident rendered themselves memorable by furnishing enjoyment in my early years.

One event I could call well to memory. I remember, when about five years old, being invited with others to the birthday treat of a school-fellow. He lived in what was then called the country, distant about two miles from where my parents resided. The invited children met together with the object of walking there in company, attended by an old favorite nurse. All went on merrily for a time, when suddenly we thought that we were about to be deprived of our anticipated treat. A high tide in the adjoining river had just overflowed its banks, and was pouring its waters freshly across the highway.

We stood a few moments in consultation,—for Napoleon in crossing the Alps could not have viewed the difficulty with more concern and circumspection than the little band viewed the ways and means to cross this little stream. The old nurse determined we should not be disappointed, took off her shoes and stockings, fastened up her garments, and then carried each of us on her back across the shallow stream in safety. At that time green fields extended as far as eye could see; the whole country around us was clothed in its summer gay and lovely garb, and the hedgerows, lanes and fields were studded with the flowers common to the district and the season. It was a sight to be remembered, which above twenty years ago had so fastened itself upon my memory that I determined to visit the exact spot again.

But how changed! In the place of this once memory cherished lane, had been accumulated miles of streets, docks, railways, and warehouses, and instead of the sweet notes of the feathered tribes that were bound to meet the ear, there was the din of busy industry at every hand; companions of my boyhood had long departed either this life or country—old land marks and familiar spots had disappeared, and to me the spot was strange and desolate.

If the work of man, in a few years, can so change the feature of a locality, as to render it scarcely recognizable again as the same spot we enjoyed so much in our boyhood, how little can we, within the small space of human existence realize the vast change in the world's surface, what thousands, it may be millions of years, may have produced. From birth to death, one continuous, incessant, and it may be imperceptible change, is developing itself, only slightly recognizable, when we are about to leave it at a ripe old age.

"Nature does nothing at once by bounds"—her shapeless operations are ever going on incessantly and without rest. Even in science, how vast have been the changes during the last century—the theories of Currier, Linnaeus, and others of similar note are now nearly obsolete; even Faraday, whose far seeing mind could realize the future when the chemist would discover that the sixty elementary substances then known to science would resolve themselves into one, but whose great mind failed to practically demonstrate what some years ago was realized by Mr. Lockyer, before the Stu-

dents of the French Academy of France.

Even the people whom Herodotus described as "living in dwellings fitted on piles which stand in the middle of lakes," the discoveries lately proceeding in the Swiss lakes, thousands of years after their time, seem to bridge over the past with the present, and show by contrast how vast have been the changes since their day.

During the years 1853-4 the waters of the Swiss lakes sank to a lower level than had been known for a great number of years. This was owing to the severity and dryness of the winter preventing the lakes from receiving their usual supply from the snowfields and glaciers of the surrounding mountains, by reason of the diminution of their streams. At Ober Meilen, on the shore of Lake Zurich, the villagers took advantage of this retreat of the waters to add to their garden and vineyards by enclosing portions of the shore with stone walls, and raising the surface within the usual level of the lake by mud dredged from its bottom. During these operations a large number of wooden piles were exposed and amongst them were found numbers of tools and weapons formed of stag-horn, flint, and other materials. The discovery having been reported to the Antiquarian Society of Zurich the celebrated Swiss Antiquary, Dr. Ferdinand Keller, commenced an investigation. The piles were made of oak, beech, fir, and other trees, varying in thickness from four to six inches, and were very numerous. Some were entire trunks, others were split in halves and quarters, and were arranged in parallel rows to the shore of the lake. Further

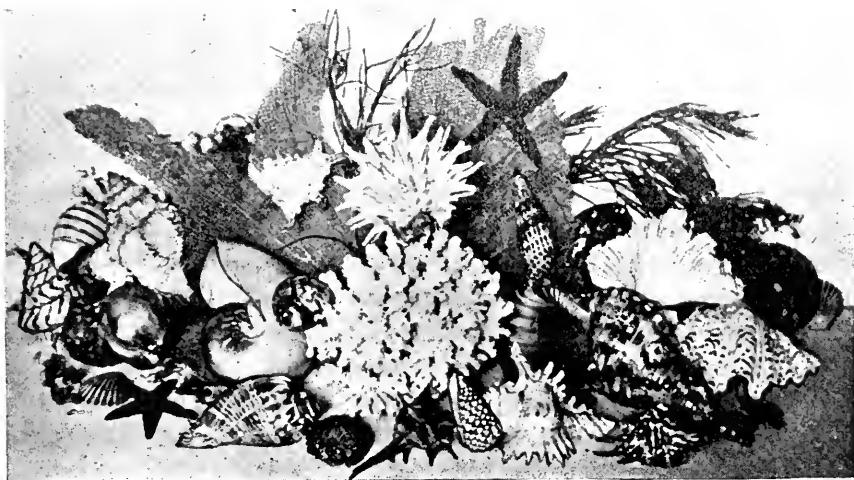
discoveries proved that cross beams had been fastened to the upright piles, upon which a platform had been erected and huts built upon it. The report of these discoveries soon spread about the neighborhood, and led to the finding of a number of other sites where lake dwellings had been erected; and from that time to the present the search has been constantly carried on, not only in Switzerland, but in many

other countries of Europe. A large number have been explored in Scotland and Ireland where they are known by the name of "Crannegs," and a few in England; chief among them being the Glastinburg village which is still undergoing exploration and examination.

To be continued.

CHAS. T. WHITING,

Montreal.



A group of showy Natural History Specimens. Cut loaned by C. K. Reed.

Some Old Time Collecting.

It has occurred to me that the readers of the MUSEUM would like to hear something of the old times I used to have collecting, when I had, what I then claimed to be, the largest amateur collection of nests and eggs and singles and doubles, *East* of the Rocky Mountains. I say *East* of the Rocky Mountains, because I had no notion of the collections *West* of them, excepting one in California, with which I did considerable trading about then.

When I made this claim I had about 325 species of eggs, and nearly 1,000

in number, and not far from 200 nests, of 50 to 70 species, and about 50 with full nest "compliments" of eggs. So I made my claims—as so many "world's champions" *shooters* do in the present generation—and for want of evidence to the contrary wore my claim.

I then lived in Amherst, Massachusetts. I began collecting in 1864 or thereabouts, and made my claim to the *championship* in 1874. I left college in 1876, when I sold many of my specimens, and packed up the rest, which were eventually donated, with many other collections, to the Agricultural

College of that state, to save them from utter ruin from moths and mice and rats, as I had no place for them or any time to hunt up some one to buy them. I suppose they are there now, but don't know.

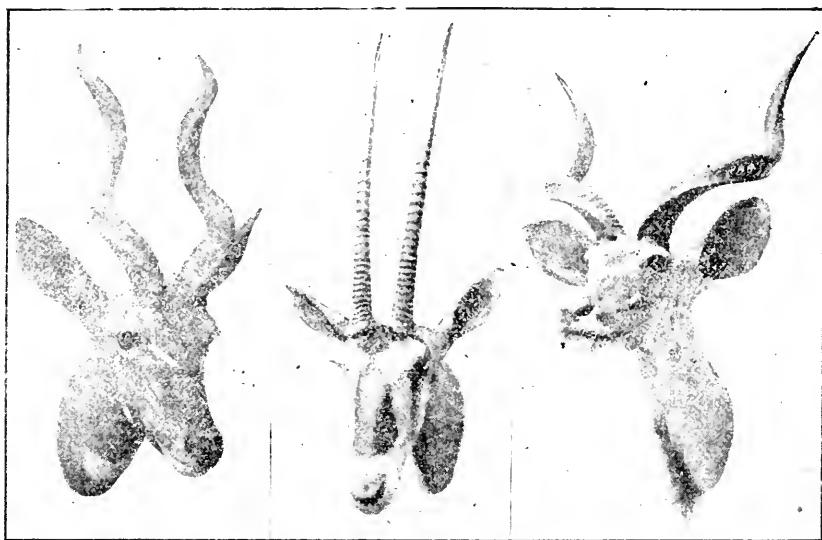
From 1864 to 1874 Amherst was the Queen of collecting centres. It was just wild enough to be crammed full of birds in the summer. The rarer migratory species were abundant in spring and fall. The woods fairly teemed all the year, with bird life. In the winter even, flocks of Crossbills by the hundreds in our garden, of both varieties. The Linnets, Woodpeckers (Red-headed and Hairy, as well as Yellow-bellied) all around the house by the dozens. Think of it?

The woods I used to go to most frequently were called the Baker's woods. A man by the name of Baker lived close by and owned much land there. He was reputed to be mean and to fire at persons whom he saw in his fields. Near by was Mill River, called Freshman River because the Sophomores used to get some poor luckless freshman and duck him in the river, every year. A man by the name of Smith owned about this river, who also used to shoot at persons whom he found in his lots. He shot at me once, but the bullet whizzed blamelessly above my head. Of course I ducked, I can laugh at it now.

The first woods back of our house was the Baker's woods. We used to call it the 1st Bakers. 100 rods from this was another which we called 2d Bakers. At right angles to this, 50 rods away, was a pine grove, back of which was a swamp; all this was called the 3d Bakers. This was only a part of my collecting ground.

About this time I began to read Audubon, Wilson, Nuttall, and all the bird-books that I could find. Singly or all together they failed to give me what I wanted, so I determined to make a bird-book for myself. With the three books above named, and a good many others, I compiled and wrote a book on the Birds of Massachusetts. At least I described about 54 birds and wrote 400 pages of commercial note paper, sitting up nights and, I mourn to say it, stealing away Sundays to work on it; perhaps that's the reason why it never amounted to anything. I have the manuscript now, and I occasionally take it out and look at it. Sigh at the amount of superfluous energy wasted, and laugh at the enthusiastic "stories" in it.

The birds. How tame they were! Right in our own garden—Baltimore and Orchard Orioles; Blue Jays and Wild Pigeons; Black and Yellow-billed Cuckoos; Red-headed, Downy, and Hairy Woodpeckers; Sparrow and Sharp-shinned Hawks—I have kept dozens of Sparrow Hawks, young and old, alive; they are beautiful pets; Brown Thrashers (we didn't then submit to the English name Thresher [not the same bird, by the way]) and Cat Birds; Turtle Doves and Partridges; "Moss" birds and "Sky Wrens"—who can tell me, these days, what they were? Well all these right in the garden not 20 rods from the house were of common, almost every day occurrences, and all but the Partridges bred there. And these are only a few of the species that I collected every year in the same place, in those days. Now we will jump the fence, take the back road, and walking less than 50



Antelope, Mounted by C. K. Reed.

rods jump the next fence into the field and proceed to 1st Bakers.

To find six Bobolinks' nests of an evening in this one field alone was simply nothing. Wait until the dew was on the grass and then go along and scare the birds off their nests, and follow up the queer furrows they made in the wet grass, was the way we used to do—at morning and evening. The Ground Birds, Song Sparrows, and Grass Finches, build on the ground, the latter in bushes, the Field Sparrows almost equally abundant in bushes; the Blue bird with blue eggs in the holes of trees and white eggs on the ground at the foot of trees; the Purple Finches and Indigo birds in the apple trees; double-yolked Chipper Birds' eggs were of common occurrence there. King Birds with white eggs and six in a nest, though not all white. Yellow Birds, and Yellow Warblers in trees; the latter with two, and three stories,

and nearly every species then had frequently one, two, and three Cowbirds eggs.

Then Meadow Larks built on the ground, Crow Blackbirds in nearly every pine and apple tree. And oh yes! House Wrens were a drug in the market—the trees of the fields and the holes in the piazzas around the houses, and nine in a nest. Then we would occasionally find a Butcher bird, but rare then as now. Purple Finches and Indigo birds as well as Cedar birds built in the apple trees. And even White-bellied Swallows, in the holes of trees in this very field. We have now reached the outskirts of the 1st Bakers and enter that then sacred and prolific precinct. Oh what a field for the collector. Brown Thrashers, on the ground and in trees six feet high with six eggs, two or three of them; Towhee Buntings; Scarlet Tanager—in those days they used to fairly swarm in the newly-plowed fields;

Great-crested Flycatchers; all the common Thrushes and the Oven-bird; Flycatchers and Vireos on tree and small bush; Titmice or Nuthatches either or both, we never knew which, in holes of trees—we never got the birds somehow; and all our collections fairly swarmed with small Warblers' eggs which we could never identify. Then came Yellow-hammers, Maryland Yellow-throats, Crows by the hundreds I might almost say—on the tip-top of nearly every pine or oak tree; Wood-cocks and Snipes, Kildeer and Spotted Sandpiper; Woodcocks; the Great-crested Flycatcher was not rare then as it is now; Whip-poor-wills and Night Hawks were prizes, yet we found them near 1st Bakers in those days. I recollect finding a young Callow Whip-poor-will, and comparing it with a like discovery in Audubon or Wilsons, I forget now which, how it delighted me. Chimney Swallows were plentiful to the venturesome youths who dared go up the chimneys with a hoe. And Barn and Eave Swallows by the hundred for the simple climbing. I could have collected 1,000 of each, say inside a week's time, and not gone half a mile from home. Ruby-throated Humming birds in nearly every garden. And Belted Kingfishers and Bank Swallows didn't then always need a river's bank to breed in. Then the Hawks and Owls that this 1st Baker's wood furnished, I will give you a list of what I remember. Great Horned Owl, Screech or Red Owl, (we considered the Red and Gray Owls then the same birds, as we took them out of the same nest, and kept them as pets.) Short Eared Owl, Barred Owl, Sharp shinned Hawk, Cooper's Hawk,

Sparrow Hawk, Red-tailed Hawk, Red-shouldered Hawk. Then came the Partridges. Well, that's about all!

The 2d and 3d Bakers was simply a magnificently magnified continuation of the 1st Bakers. Sometimes we followed down to the river, braved Mr. Smith's bullets, which we all stood in mortal fear of, and found besides many of these same species, the Marsh Hawk, the Bittern, the Green Heron, the Black Duck, the Rails—we never knew which species they were; rarely a stray Goose's egg—a real one I mean, Canada Goose—was heralded. We used, I believe, to claim the Coot as breeding in marshy places then. They were very common in our rivers and ponds, at any rate.

What collecting we used to have! It was not necessary to go over a mile from home to find say 50 specimens each perhaps of say two-thirds of the list mentioned. What royal sport we used to have!

Our collecting outfit was a simple fish basket full of cotton batting and tin, salt, pepper and spice boxes as well as army cap boxes. They were just big enough to take up the tree and drop down without breaking the eggs inside. As urchins we always had our turns bringing the eggs down in our mouth. When we each systematically stopped it and took to the boxes. Nobody ever said a word, yet the culmination of this event was always breaking a rotten egg in our mouth and sometimes swallowing its contents. We didn't carry climbers then, and lost many a valuable find. If we couldn't shin the tree, we went round and round it, gazing up until our necks were sore, till somebody would give in licked, and

say, "come on, boys." I shall never forget my last shin. It was in a large swamp, a tall tree with dead branches way up, a Cooper's Hawk's nest with 4 fresh eggs, a mortal fear that the Hawk would come and pick my eyes out, and no way under heaven, it appeared to me, to get the eggs down. I did get the eggs down. I don't think I did get the nest, I don't remember that. It is not so firmly impressed on my memory. How I got the eggs I can't tell for the life of me. I've a faint recollection of trying to put one of them into my mouth, whether I did or not I can't tell for I don't remember.

And now, boys, do you want a first class, cheap, really fine display case for your Birds' Eggs? Go to the book-store or furniture store and take for a model, the oblong, square revolving bookcase so common these days. Build it up on a stand or legs, not necessarily revolving; build it up of a series of low flat boxes each one smaller than the one below it. Now you will have four sides. Build a frame work resting on the top and bottom layer and corner it or fit it with glass and you have it. A complete glass show case. With lock and key for your own use. Forget where the key is when you don't want to open it. You can make these cases any size you want, and as many of them as you want. All together or one at a time. One foot high or three feet high. But it is getting late and so I will stop.

Yours as ever,

W. A. STEARNS.

Collecting Plants.

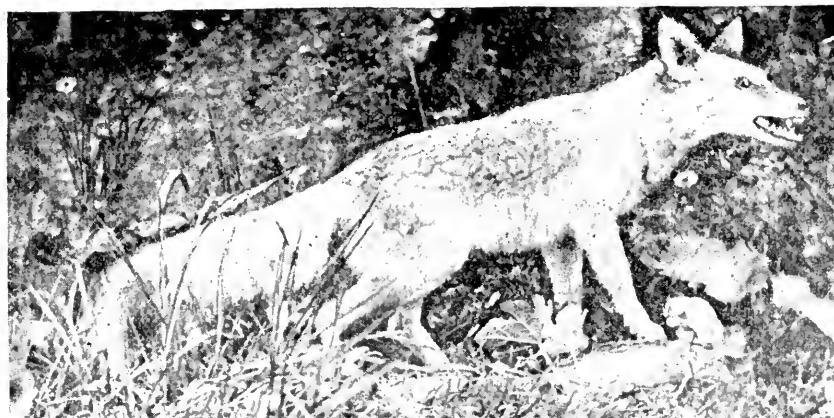
The collector of plants requires but little apparatus: a few quires or reams of unsized paper, of folio size, will

furnish all that will be needed. The specimens as gathered may be placed in a tin box, or, still better, in a portfolio of paper, until reaching home. About forty or fifty sheets of the paper should be put into the portfolio on setting out on an excursion. Put the specimens of each species in a separate sheet as fast as gathered from the plant, taking a fresh sheet for each additional species. On returning to camp, place these sheets (without changing or disturbing the plants) between the absorbent drying papers in the press, and draw the straps tight enough to produce the requisite pressure. The next day the driers may be changed, and those previously used laid in the sun to dry; this to be continued until the plants are perfectly dry. If paper and opportunities of transportation be limited, several specimens from the same locality may be combined in the same sheet after they are dry.

Place in each sheet a slip of paper having a number or name of locality written on it corresponding with a list kept in a memorandum book. Record the day of the month, locality, size, and character of the plant, color of flower, fruit, &c.

If the stem is too long, double it or cut it into lengths. Collect, if possible, half a dozen specimens of each kind. In the small specimens, collect the entire plant, so as to show the root.

In many instances, old newspapers will be found to answer a good purpose both in drying and in keeping plants, although the unprinted paper is best—the more porous and absorbent the better.



Mounted by C. K. Reed.

When not travelling, pressure may be most conveniently applied to plants by placing them between two boards, with a weight of about 50 lbs. laid on the top.

In collecting algae, care should be taken to bring away the entire specimen with its base or root. The coarser kinds may be dried in the air but not exposed to too powerful a sun, turning them from time to time. These should not be washed in fresh water, if to be sent any distance. The more delicate species should be brought home in salt water, and washed carefully in fresh, then transferred to a shallow basin of clean fresh water, and floated out. A piece of white paper of proper size is then slipped underneath, and raised gently out of the water with the specimen on its upper surface. After finally adjusting the branches with a sharp point or brush, the different sheets of specimens are to be arranged between blotters of bibulous paper and cotton cloth, and subjected to gentle pressure. These blotters must be frequently changed till the specimens are dry.

Mr. Leonhard Stejneger, curator of department of reptiles and batrachians, U. S. National Museum is making another trip to the Commander Islands. With a veteran like Mr. Stejneger in the far north we may confidently hope to hear of some new and rare finds in the near future.

Rev. H. C. Meredith of Ukiah, Calif. sends a clipping from the *San Francisco Examiner* giving details of a battle between two boys of his place and a large eagle. The eagle had been noticed in the vicinity of Halls Peak for a long time. On May 9th Willie and Eddie Briggs, aged 13 and 11 respectively resolved to find its nest, and in scaling a cliff over 1000 feet high were attacked by the eagles. The youngest lad was repeatedly knocked down and torn by the birds talons and beak. He will lose sight of both eyes and be disfigured for life, and only for heroic effort of the older brother would doubtless have been killed. A searching party was organized and the birds secured, one of which measured 8 feet 8 inches from tip to tip. We regret we cannot print the article entire.

THE MUSEUM.

A Monthly Magazine devoted to Ornithology, Oology, Mollusca, Echinodermata, Mineralogy and Allied Sciences.

Walter F. Webb, Editor and Pub'r,
Albion, N. Y.

Correspondence and items of interest on above topics, as well as notes on the various Museums of the World—views from same, discoveries relative to the handling and keeping of Natural History material, descriptive habits of various species, are solicited from all.

Make articles as brief as possible and as free from technical terms as the subjects will allow. All letters will be promptly answered.

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WALTER F. WEBB,
ALBION, ORLEANS CO., N. Y.

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NOTES.

Mr. Will Brown of Milton, Wis., whose advertisement has frequently been seen in our exchange columns was drowned in Sweetwater Lake, N. D. on May 7th. The young man was 21 years old and had gone to North Dakota to collect skins and eggs with Mr. Coon also of Milton, Wis. He had gone out on the lake alone shooting and the particulars of his tragic death will probably never be known.

Mr. Ora W. Knight of Bangor, Me., a naturalist of considerable repute, has been elected assistant instructor in Natural History in the Maine State College from which he recently graduated. Prof. F. L. Harvey is at the head of the Department.

Mr. E. G. Haymond, a taxidermist of Flint, Mich., intends to start soon for an extended trip to Alaska. We trust he may be eminently successful and come back hale and hearty.

We have an interesting photo from Dr. W. M. Martin of Wellington, Kansas, showing him in the act of securing a set of Eagle eggs from a cliff 200 feet high in the Indian Territory the past season. The cliff was a very dangerous one to scale, and the Doctor was kodaked by his younger brother. Unfortunately the picture is too light to reproduce well.

With this number, and hereafter, foreign subscribers may secure the MUSEUM of either, *R. Friedlander & Son, Berlin, N. W., Carlstrasse 11*, general agents for Germany and the north, or of *Swann & Co., 1 and 2 Bonnerie Street, Fleet St., London, England*. Our foreign list, so constantly on the increase has demanded the establishment of these agencies.

A series of Natural History handbooks edited by Edward Knobel and published by Bradlee Whidden, 18 Arch St., Boston, are the *very best* we have seen on their respective subjects. They are designed as *Guide Books* for students of Natural History. There are now ready, *Trees and Shrubs of New England*, *Ferns and Evergreens of New England*, *The Butterflies and Duskflies of New England* and *The Beetles of New England*. They are oblong shape, printed on fine glazed paper and contain several hundred cuts each. Nothing has ever been published at so low a price as 50 cents that so thoroughly covers the subjects.

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Three numbers more and we complete *Volume One*. We desire to close the year with the best record ever made by any Naturalist Magazine, and to make it an object to every present subscriber, and any other party who will "aid in the good work," the following large list of premiums are offered.

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During July, August and September, for each new subscription received, accompanied by \$1.00, you may select premiums to the value of \$1.00. We offer all premiums at low rates and not at "padded" prices as is usually the case. For instance: Send two new subscribers, and \$2.00 and you can select Birds Eggs to value of \$2.50, or Indian Relics, Showy Shells, Curios, Supplies, Books, etc. Note the prices on Shells, Supplies of all kinds, Books, etc.

Parties wishing to compete for large premium may send in subscriptions one or more at a time and we will return credit cards which can be used any time before October 1st.

It would not be possible for us to make a more liberal offer than this and we trust all subscribers and collectors who see this notice will make an effort. If you cannot do anything at it, show to some interested friend and thereby do him a favor as well as ourselves.

WALTER F. WEBB, Editor and Publisher,
ALBION, N. Y.

One Dollar's worth of any specimens mentioned below, given as a premium, for each new subscriber to the Museum.

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I herewith present a list of Eggs at lower prices than ever offered before by any Reliable Dealer. All are first-class and guaranteed to please. Each egg will be numbered to correspond with a printed catalogue which will be sent with the specimens. All packages will be sent prepaid by mail or Express. Our system of packing is so perfect that breakage rarely occurs. As an inducement to make order as large as possible, I make the Following Offer:—

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Parasitic Jaeger.....	50	Harlequin Duck.....	1 00	Turnstone.....	2 00
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Iceland Gull.....	1 25	King Eider.....	1 50	Bob-white.....	10
Great Black-backed Gull.....	60	American Scoter.....	2 00	Florida Bob-white.....	15
Western Gull.....	30	Velvet Scoter.....	50	Texan Bob-white.....	10
Herring Gull.....	20	White fronted Goose.....	1 00	Mountain Partridge.....	75
American Herring Gull.....	20	Canada Goose.....	1 00	Chestnut-bellied Scaled Partridge.....	35
California Gull.....	30	Black bellied Tree Duck.....	2 00	California Partridge.....	10
Ring-billed Gull.....	25	Whooping Swan.....	2 50	Valley Partridge.....	20
Mew Gull.....	25	American Flamingo.....	1 00	Dusky Grouse.....	2 00
Laughing Gull.....	20	White Ibis.....	35	Sooty Grouse.....	55
Caspian Tern.....	50	White-faced Glossy Ibis.....	1 00	Ruffed Grouse.....	15
Royal Tern.....	40	Wood Ibis.....	1 00	Gray Ruffed Grouse.....	75
Cabot's Tern.....	40	American Bittern.....	75	Oregon Ruffed Grouse.....	40
Forster's Tern.....	10	Least Bittern.....	20	Willow Ptarmigan.....	1 00
Common Tern.....	08	Great Blue Heron.....	25	Rock Ptarmigan.....	1 00
Arctic Tern.....	70	European Blue Heron.....	20	Prairie Hen.....	20
Roseate Tern.....	15	American Egret.....	30	Sage Grouse.....	50
Least Tern.....	08	Snowy Heron.....	15	Chachalaca.....	75
Sooty Tern.....	25	Louisiana Heron.....	12	Red-billed Pigeon.....	1 00
Bridled Tern.....	1 00	Little Blue Heron.....	12	White-crowned Pigeon.....	1 00
Black Tern.....	10	Green Heron.....	12	Mourning Dove.....	13
Noddy.....	50	Black-crowned Night Heron	12	White-fronted Dove.....	35
Fulmar.....	75	Limpkin.....	75	White-winged Dove.....	20
Manx Shearwater.....	1 00	King Rail.....	20	Ground Dove.....	30
Leach's Petrel.....	20	Clapper Rail.....	12	Mexican Ground Dove.....	50
Yellow-billed Tropic Bird.....	2 50	Virginia Rail.....	20	Inca Dove.....	75
Gannet.....	35	Spotted Crake.....	30	Turkey Vulture.....	75
Anhinga.....	25	Sora.....	10	Black Vulture.....	75
Cormorant.....	50	Corn Crake.....	20	Swallow-tailed Kite.....	10 00
Florida Cormorant.....	25	Purple Gallinule.....	25	Mississippi Kite.....	4 00
Farallone Cormorant.....	50	Florida Gallinule.....	10	Marsh Hawk.....	35
Brandt's Cormorant.....	25	European Coot.....	15	Sharp-shinned Hawk.....	1 60
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Widgeon.....	25	Wilson's Snipe.....	1 50	Fla. Red-shouldered Hawk	65

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Swainson's Hawk.....	.50	Prairie Horned Lark.....	15	White-eyed Towhee.....	.50
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Rough-legged Hawk.....	.60	Texan Horned Lark.....	30	Spurred Towhee.....	.25
Ferruginous Rough-leg.....	.25	Ruddy Horned Lark.....	35	Oregon Towhee.....	.25
Golden Eagle.....	.6 00	American Magpie.....	15	Green-tailed Towhee.....	.50
Gray Sea Eagle.....	.2 00	Yellow-billed Magpie.....	35	California Towhee.....	.10
Bald Eagle.....	.3 00	Blue Jay.....	05	Abert's Towhee.....	.75
Gryfalcon.....	.6 00	Florida Blue Jay.....	32	Cardinal.....	.05
Prairie Falcon.....	.2 00	Blue-fronted Jay.....	75	Arizona Cardinal.....	1 00
Duck Hawk.....	.3 00	Florida Jay.....	75	Gray-tailed Cardinal.....	.1 50
Pigeon Hawk.....	.2 50	California Jay.....	25	Texan Cardinal.....	.35
Merlin.....	.50	Green Jay.....	1 25	Rose breasted Grosbeak.....	.10
Kestrel.....	.20	American Raven.....	1 00	Black-headed Grosbeak.....	.15
American Sparrow Hawk.....	.20	American Crow.....	.65	Blue Grosbeak.....	.20
Desert Sparrow Hawk.....	.25	Florida Crow.....	.35	Western Blue Grosbeak.....	.25
Audubon's Caracara.....	1 00	Northwest Crow.....	.35	Indi. O Bunting.....	.05
American Osprey.....	.50	Fish Crow.....	35	Lazuli Bunting.....	.20
American Barn Owl.....	.30	Starling.....	10	Painted Bunting.....	.10
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Short-eared Owl.....	.1 50	Western Bobolink.....	35	Grassquit.....	1 00
Barred Owl.....	.1 00	Cowbird.....	03	Dickcissel.....	.05
Florida Barred Owl.....	.1 25	Dwarf Cowbird.....	40	Lark Bunting.....	.25
Screech Owl.....	.50	Red-eyed Cowbird.....	40	Scarlet Tanager.....	.25
Florida Screech Owl.....	.50	Yellow-headed Blackbird.....	40	Summer Tanager.....	.25
Texan Screech Owl.....	.50	Red-winged Blackbird.....	02	Purple Martin.....	.12
California Screech Owl.....	.50	Colored Blackbird.....	19	Cliff Swallow.....	.03
Great Horned Owl.....	1 00	Tricolored Blackbird.....	15	Barn Swallow.....	.05
Western Horned Owl.....	1 00	Meadowlark.....	10	Tree Swallow.....	.15
Hawk Owl.....	1 00	Western Meadowlark.....	10	Bank Swallow.....	.03
Burrowing Owl.....	.15	Hooded Oriole.....	50	Rough-winged Swallow.....	.25
Florida Barrowing Owl.....	.1 50	Arizona Hooded Oriole.....	06	Cedar Waxwing.....	.10
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Yellow-billed Cuckoo.....	.10	Baltimore Oriole.....	06	Loggerhead Shrike.....	.08
California Cuckoo.....	.20	Bullock's Oriole.....	10	White-rumped Shrike.....	.08
Black-billed Cuckoo.....	.15	Brewer's Blackbird.....	03	California Shrike.....	.05
Belted Kingfisher.....	.20	Purple Grackle.....	05	Red-eyed Vireo.....	.10
Hairy Woodpecker.....	.50	Florida Grackle.....	10	Warbling Vireo.....	.15
South'n Hairy Woodpecker.....	.00	Bronzed Grackle.....	05	Cassin's Vireo.....	1 00
Harris's Woodpecker.....	.75	Great-tailed Grackle.....	15	White-eyed Vireo.....	.15
Downy Woodpecker.....	.20	Boat-tailed Grackle.....	15	Bell's Vireo.....	.15
Gardner's Woodpecker.....	.50	Pine Grosbeak.....	1	Black and White Warbler.....	.50
Red-cockaded Woodpecker.....	.1 50	Purple Finch.....	25	Prothonotary Warbler.....	.25
Baird's Woodpecker.....	.1 00	California Purple Finch.....	05	Worm-eating Warbler.....	.70
White-headed Woodpecker.....	.00	House Finch.....	35	Blue-winged Warbler.....	1 50
Yellow-bellied Sapsucker.....	.50	Redpoll.....	05	Golden-winged Warbler.....	.75
Pileated Woodpecker.....	.00	American Goldfinch.....	05	Nashville Warbler.....	.75
Red-headed Woodpecker.....	.08	Western Goldfinch.....	10	Lutescent Warbler.....	.00
Californian Woodpecker.....	.40	Arkansas Goldfinch.....	10	Parula Warbler.....	.20
Lewis's Woodpecker.....	.35	Lawrence's Goldfinch.....	20	Yellow Warbler.....	.05
Red-bellied Woodpecker.....	.25	Snowflake.....	50	Myrtle Warbler.....	.15
Golden-ir'ted Woodpecker.....	.50	Lapland Longspur.....	75	Magnolia Warbler.....	.50
Flicker.....	.03	Chestnut-collared Longspur.....	35	Chestnut-sided Warbler.....	.15
Red-shafted Flicker.....	.10	McCown's Longspur.....	00	Black Poll Warbler.....	.75
Northwestern Flicker.....	.25	Vesper Sparrow.....	05	Bl'k-throated Gr'n Warbler.....	.50
Chuck-will's-widow.....	.1 50	Western Vesper Sparrow.....	15	Prairie Warbler.....	.30
Whip-poor-will.....	.1 50	Oregon Vesper Sparrow.....	25	Oven-bird.....	.20
Merrill's Paraque.....	.2 50	Savanna Sparrow.....	10	Louisiana Water-thrush.....	.50
Nighthawk.....	.40	Western Savanna Sparrow.....	20	Maryland Yellow-throat.....	.12
Western Nighthawk.....	.40	Grasshopper Sparrow.....	20	Western Yellow-throat.....	.25
Florida Nighthawk.....	.1 00	W. Grasshopper Sparrow.....	20	Yellow-breasted Chat.....	.08
Texan Nighthawk.....	.40	Sharp-tailed Sparrow.....	35	Long-tailed Chat.....	.15
Chimney Swift.....	.12	Seaside Sparrow.....	05	Hooded Warbler.....	.50
Ruby-throated Hummingbird.....	.50	Lark Sparrow.....	03	American Redstart.....	.50
Anna's Hummingbird.....	.50	Western Lark Sparrow.....	05	White Wagtail.....	.15
Sciss-or-tailed Flycatcher.....	.10	White-crowned Sparrow.....	50	Meadow Pipit.....	.10
Kingbird.....	.03	Gambel's Sparrow.....	15	Red-throated Pipit.....	.10
Couch's Kingbird.....	.1 00	White-throated Sparrow.....	35	American Dipper.....	1 75
Arkansas Kingbird.....	.06	Chipping Sparrow.....	02	Sage Thrasher.....	.00
Cassin's Kingbird.....	.25	Western Chipping Sparrow.....	06	Mockingbird.....	.50
Crested Flycatcher.....	.12	Clay-colored Sparrow.....	25	Catbird.....	.05
Mexican Cr'ted Flycatcher.....	.40	Brewer's Sparrow.....	35	Brown Thrasher.....	.09
Ash-throated Flycatcher.....	.25	Field Sparrow.....	03	Sennett's Thrasher.....	.03
Phoebe.....	.04	Western Field Sparrow.....	25	Curve-billed Thrasher.....	.15
Say's Phoebe.....	.15	Slate-colored Junco.....	20	California Thrasher.....	.15
Black Phoebe.....	.15	Black-throated Sparrow.....	35	Bendire's Thrasher.....	.06
Wood Pewee.....	.12	Song Sparrow.....	02	Palmer's Thrasher.....	.75
Western Wood Pewee.....	.20	Desert Song Sparrow.....	35	Cactus Wren.....	.75
Western Flycatcher.....	.20	Mountain Song Sparrow.....	23	Rock Wren.....	.10
Acadian Flycatcher.....	.15	Heermann's Song Sparrow.....	10	Carolina Wren.....	.19
Little Flycatcher.....	.25	Samuel's Song Sparrow.....	05	Florida Wren.....	.70
Trail'l's Flycatcher.....	.15	Rusty Song Sparrow.....	40	Lomita Wren.....	.28
Least Flycatcher.....	.15	Swamp Sparrow.....	12	Bewick's Wren.....	.28
		Texas Sparrow.....	50	Vigor's Wren.....	.28

One Dollar's worth of any specimens mentioned below, given as a premium, for each new subscriber to the Museum.

	INTRODUCED SPECIES.	
Baird's Wren.....	25	Sand Martin..... 03
House Wren.....	65	Tree Creeper..... 05
Parkman's Wren.....	15	Capercaillie..... 50
Western House Wren.....	65	Ring Dove..... 10
Short-billed Marsh Wren ..	75	Turtle Dove..... 05
Long-billed Marsh Wren ..	65	Black Cap..... 05
Tule Wren.....	12	Great Tit..... 20
Brown Creeper.....	75	Blue Tit..... 15
White-breasted Nuthatch ..	35	Marsh Tit..... 20
slender-billed Nuthatch ..	75	Kingfisher..... 15
Brown-headed Nuthatch ..	25	Barbury Partridge..... 10
Pygmy Nuthatch ..	10	Red-leg Partridge..... 15
Tufted Titmouse.....	35	Carion crow..... 20
Texan Tufted Titmouse ..	75	Chiff Chaff..... 05
Plain Titmouse.....	50	Rook..... 10
Chickadee.....	12	Quail..... 10
Long-tailed Chickadee ..	50	Long eared Owl..... 35
Oregon Chickadee ..	35	Tawny Owl..... 50
Carolina Chickadee ..	15	Little Owl..... 40
Mountain Chickadee ..	50	Redshanks..... 25
California Chickadee ..	50	Stock Dove..... 15
Wren-tit.....	50	Red-backed Shrike..... 50
Bush-tit.....	25	Jay..... 10
Californian Bush tit ..	15	Magpie..... 05
Verdin.....	35	Jackdaw
Blue-gray Gnatcatcher ..	20	05
Westren Gnatcatcher ..	50	Greenfinch..... 05
Plumbeous Gnatcatcher ..	75	House Sparrow
Black-tailed Gnatcatcher ..	50	Bullfinch..... 10
Wood Thrush.....	65	Lesser Redpoll..... 20
Wilson's Thrush ..	12	Gt. Black Woodpecker
Russet-backed Thrush ..	15	Cuckoo..... 50
Olive-backed Thrush ..	35	Cr'l Bunting..... 25
Hermit Thrush ..	30	Yellow Bunting..... 05
Red-winged Thrush ..	25	Black-headed Bunting
American Robin.....	03	Willow Warbler..... 05
Western Robin.....	10	Robln..... 05
Red-spotted Bluethrout ..	75	Common Sandpiper
Wheatear.....	10	Common Snipe..... 25
Bluebird.....	02	Water Rail..... 30
Western Bluebird ..	12	White-fronted Goose
Mountain Bluebird ..	12	Moorhen..... 15
	12	Sociable Plover..... 30
	FOREIGN EGGS.	
	Sand Martin..... 03	
	Tree Creeper..... 05	
	Capercaille..... 50	
	Ring Dove..... 10	
	Turtle Dove..... 05	
	Black Cap..... 05	
	Great Tit..... 20	
	Blue Tit..... 15	
	Marsh Tit..... 20	
	Kingfisher..... 15	
	Barbury Partridge..... 10	
	Red-leg Partridge..... 15	
	Carion crow..... 20	
	Chiff Chaff..... 05	
	Rook..... 10	
	Quail..... 10	
	Long eared Owl..... 35	
	Tawny Owl..... 50	
	Little Owl..... 40	
	Redshanks..... 25	
	Stock Dove..... 15	
	Great-crested Grebe	
	Chukar Partridge..... 20	
	MISCELLANEOUS.	
	Gopher..... 35	
	Skate..... 05	
	Shark..... 10	
	Devil Fish..... 10	
	Hammerhead Shark..... 15	
	Nurse Shark..... 20	
	Egg case of Periwinkle	
	Fossil Fish Eggs per 12	
	Alligator..... 35	
	Mud Turtle..... 10	
	Musk Turtle..... 15	
	Snapping Turtle..... 15	
	Emu (Hole in end)..... 2 50	
	Ostrich (Hole in end)..... 1 50	
	Rhea (Hole in end)..... 2 00	
	Hummingbird nests 10 to 50c	
	each, according to condition	
	and beauty.	

INDIAN RELICS.

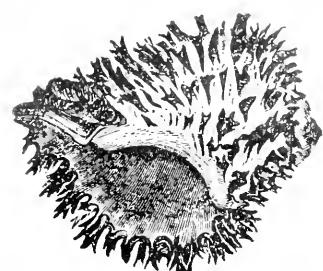
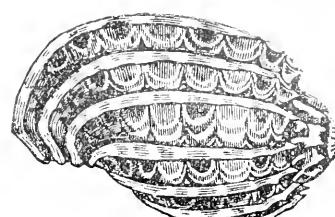
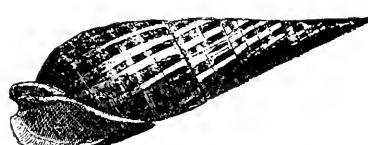
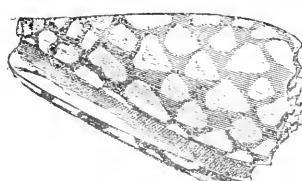
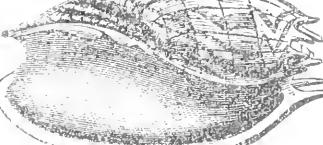
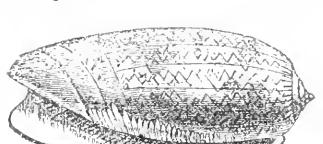
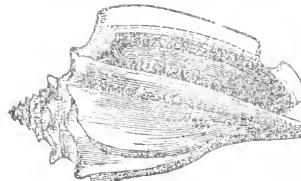
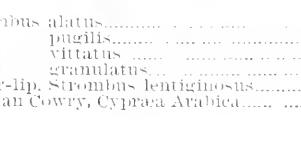
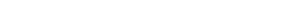


INDIAN RELICS.

Arrow heads, bird points	\$.50 to \$ 1.00	Knives, curved back..... 25	1.00
" war points, triangular ..	07	" double edged..... 25	1.00
Arrow heads, war points, notched ..	10	" straight edge..... 25	1.00
" bimini ..	07	" unnotched	05
" shallow notched	05		25
" deep notched	10	Axes, small grooved	25
" double notched	25	" medium grooved	75
" pointed both ends	25	" large grooved	1.00
" leaf-shaped	10	Celts, all grades and localities	25
" unnotched	05	Hammer stones	1.00
" stemmed	05	Pestles	25
" serrated	10	Sinkers	10
" white-quartz	05	Gorgets	30
" assorted doz.	25	Pipes	50
" hund.	2.00	Tubes	1.00
Spearheads, triangular ..	25	Banner Stones	2.00
" leaf shaped	25	We put up a fine assorted collection for beginners, 25 pieces	10.00
" long slender notched	15	Pamphlets on above:	
" deep notched	25	Agricultural Flint Imp	10
" ordinary poor to fine ..	05	Savage Weapons at the Centennial	60
		Arch. Coll. of the U. S. Nat. Mus.	1.50
		Thomas's Prehistoric Anth	35
		Moorehead's Fort Ancient	2.00

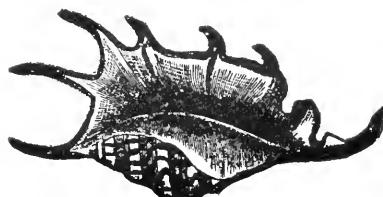
One Dollar's worth of any specimens mentioned below, given as a premium, for each new subscriber to the Museum.

Showy Sea Shells.

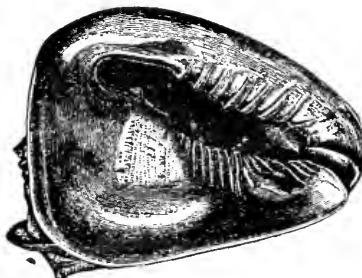
Paper Nautilus, <i>Argonauta Argo</i>	\$1.00	Foxhead, <i>Voluta scapha</i>	12		
Pearly Nautilus, <i>Nautilus Pompilius</i>	1.50	Gem Shell, <i>Margarites apicina</i>	05		
White Murex, <i>Murex ramosus</i>	25	Oliva inflata	05		
Rose Murex, <i>Murex regius</i>	25	Oliva reticularis	05		
Pink Murex, <i>Murex princeps</i>	25	Olive or Key Shell, <i>Oliva littoralis</i>	05		
					
					
Black Murex, <i>Murex radix</i>	25	Harp Shell, <i>Harpa ventricosa</i>	25		
Thorny Woodcock, <i>Murex tenuispina</i>	20				
					
Fulgor carica	15	Marlinspike, <i>Terebra maculata</i>	15		
Snipe-billed Murex, <i>Murex haustellum</i>	20	Auger Shell, <i>Terebra punctulata</i>	10		
African Murex, <i>Murex saaitalis</i>	20				
Purpura patula	10				
Trumpet Shell, <i>Triton tritonis</i>	1.50				
Fasciolaria tulipa	20				
Fasciolaria distans	15				
					
Melon Shell, <i>Melo diadema</i>	25	Lion Cone, <i>Conus leoninus</i>	10		
Mitre Shell, <i>Mitra episcopalis</i>	15	Captain's Cone, <i>Conus capitaneus</i>	15		
Voluta vespertilio	12	Miles Soldier, <i>Conus miles</i>	15		
					
Tent Shell, <i>Oliva porphyria</i>	50	Conch Shell, <i>Strombus gigas</i>	20		
					
Strumbus alatus	10	Points or Cones cut from Conch for ornament, painting or decorating	25		
" pugilis	10				
" vittatus	10				
" granulatus	10				
Silver-lip, <i>Strumbus lentiginosus</i>	10				
Arabian Cowry, <i>Cypraea Arabica</i>	12				

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Gnawed Cowry, Cypraea erosa
Zebra Cowry, Cypraea asselus
Snake-head Cowry, Cypraea caputserpentis
Cauri Cowry, Cypraea caurica .....	.....
Cypraea helvola .....	.....
Lynx Cowry, Cypraea lynx .....	.....
Mourning Cowry, Cypraea Mauritanica .....	.....
Money Cowry, Cypraea moneta .....	.....
Mole Cowry, Cypraea talpa .....	.....

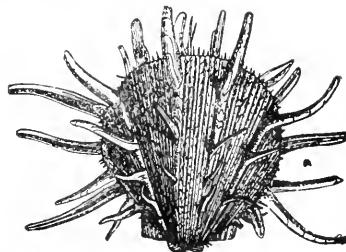


Spider Shell, Pterocera lambis .....	.....
Hooked Scorpion, Pterocera rugosa .....	.....
Scorpion, Pterocera Chiragra .....	.....
Orange Scorpion .....	.....
Pelican's Foot, Aporrhais-pes-pelicanus .....	.....
Tiger Cowry, Cypraea tigris .....	.....
Tiger Cowry with Lord's Prayer engraved on .....	.....
Panther Cowry, Cypraea pantherina .....	.....
Calf Cowry, Cypraea vitellus .....	.....
Spotted Cowry, Cypraea exanthema .....	.....
Egg Shell, Ovulum ovum .....	.....
Trivias .....	.....



Helmet Shell, Cassis Madagascarensis .....	.....
Yellow Helmet, Cassis cornuta .....	.....
Black Helmet, Cassis tuberosa	1 00
Cameo Shell, Bulimouth, Cassis rufa .....	.....
Cask Shell, Dolium perdix .....	.....
Natica canerena .....	.....
Stair-case Shell, Solarium perspectivum .....	.....
Tectarius muricatus .....	.....
Worm Shell, Vermetus imbericalls .....	.....
Vermetus clumps	25
Screw Shell, Turritella	10
Bleeding Tooth, Nerita peleronta	03
Nerita tessellata	03
Nerita zigzag	03
Top Shell, Turgo marmoratus	50
ditto, cleaned	50
ditto, polished pearl	50
Turk's Cap, Turbo Sarmaticus	25
Gold Mouth, Turbo chrysostoma	15
Pearl Trochus, Trochus niloticus	25
Maggie Trochus, Trochus pica	10
Red Ear polished	1 00
ditto, natural	1 00
Key-hole Limpet, Fissurella Barbadensis	12
Owl Shell, Lottia gigantula	20
Scaly-ribbed chiton, Chiton squamosus	20

Coil Shell, Helix heamastoma	10
Black-mouth Snail, Helix melanotragus	10
Agate Shell, Achatina variegata	30
Peanut Shell, Strophia glans	02
Tusk Shell, Dentalium entallus	02
Angel Wing, Pholas costas	20



Spondylus, fine 2:00
A fine line scientific shells always in stock, which we send on approval at low rates to responsible parties.

MARINE CURIOS.

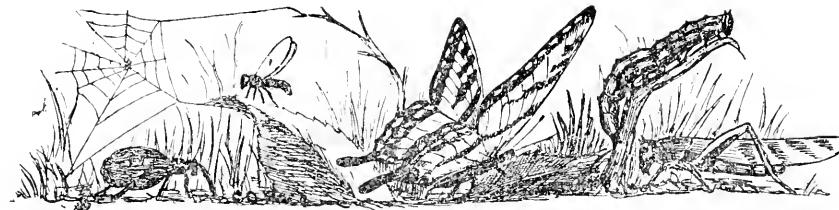
Hammerhead or Leopard Shark eggs, Pacific	\$ 10	\$ 35
15 Nurse Shark eggs, Bahamas .....	.....	50
Acorn Barnacles, Pacific	05	1 00
Goose Barnacles	05	.50
05 Alligator Skins, 2 ft	2 00	.....
" 3 ft	3 00	.....
Egg Cases of Periwinkle	15	25
Sea Horses, Atlantic	25	1 00
" Medit	35	50
Hermit Crab in Shell	25	75
Sand Crab	10	25
King or Horse-foot Crabs	10	1 50
Skate Eggs .....	.....	05



Shark Eggs .....	.....	12
Devil Fish Eggs .....	.....	10
Porcupine Fish, small	75	3 00
" " large	5 00	10 00
Hawk-bill Turtle, mounted, polished back	7 50	15 00
40 Hawk-bill Turtle backs, polished	4 00	6 00
10 Sturgeon Plates	05	25
25 Shark's Teeth	05	25
05 Lucky Tooth from Cod .....	.....	10
.....
Saw Fish Saws, 8 to 12 inches	35	75
" " 2 to 3 feet	1 50	3 00
15 Sword-fish Sword, 2 to 3½ ft	1 50	2 00
25 Alligator Teeth, ¾ inch .....	.....	03
" " 1 inch .....	.....	05
" " 1½ inch	10
" " 1¼ inch	15
12 " 2 inches	25
20 Sperm Whale Teeth	1 00	3 00
Walrus Tusks	2 00	4 00

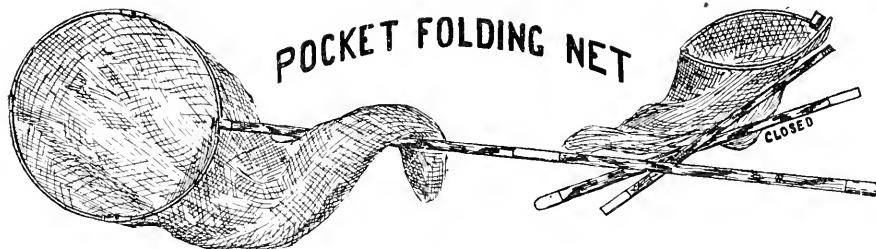


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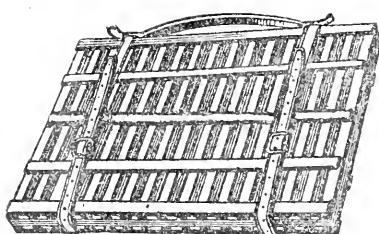
Entomologists' Supplies.

Dredge	\$1 00	Cyanide Cans, best out.....	1 00
Forceps	35, 75, 2 50	Insect Pins, in any quantity.	
Cases, 10x14 glass or wood top	1 00	Klaegers, sizes 00 to 8 per hund. 15c; per	
Cases, 12x18 glass or wood top	1 50	1000.....	1 25
Cops, each.....	10	Best German, 00 to 10 bright or Japanned.	
Cork, cheap $\frac{1}{8}$ in., doz	40	per hund, 15c; per 1000.....	1 25
" best $\frac{1}{8}$ in. "	90	Cyanide of potassium, oz.....	15
" cheap $\frac{1}{4}$ in. "	1 25	Disinfecting Cones, best out, doz.....	15
" best $\frac{1}{4}$ in.	2 00		



NEW COLLECTING NET.—Finest thing ever gotten out, $3\frac{1}{2}$ feet, bamboo handle, nickel ring and trimmings. Fine woven net. Ring is adjusted with

hinges, so can be collapsed and carried in pocket, screws on to handle, and handle is in two parts, that screw together. Weight complete, 7 oz., *prepaid for only 1 50*



Botanists' Supplies.

Collecting Cans, 14x3x5.....	\$1 25
" " 16x4 $\frac{1}{2}$ x7.....	1 50
" " 20x6x8.....	2 00
Drying Paper, per quire.....	35
Gummed Paper per sheet.....	10
Mounting Paper, sheet, 2c; 100.....	1 50
Genus covers, 3c each; 100.....	2 50
Microscopes, 30c to \$2.00. Send description of what you want.	
Presses, "The Queen" finest made.....	2 50

One Dollar's worth of any specimens mentioned below, given as a premium, for each new subscriber to the Museum.

Fossils.

Trilobites <i>Calymene niagarcensis</i>	\$ 15	\$.50
" " <i>senaria</i>	25	1 00
Fossil Shark Teeth, small from Va.	55	10
" " " from S. C.	55	50
Fossil Fish. Green River, Wyo.	150	5 00
" " Cape Colony, So. Af.	300	10 00
Pentremites	55	25
Baculites, Bad Lands	10	2 00
Scaphites, "	10	3 00
Ammonites, Bad Lands	50	5 00
Nautilus, "	50	3 00
" Innervolutions, Bad Lands	15	25
Inoceramus, Bad Lands	10	1 00
Teeth of <i>Titanotherium</i>	50	1 00
" " <i>Hyracodon</i>	15	35
" " <i>Ateratherium</i>	25	40
" " <i>Mesochippus</i>	10	15
Trigonocarpus Nuts, Ohio	15	25
Carboniferous Leaves and Ferns in kidney shaped concretions from Mason Creek	15	1 00
Exogyras, Texas	05	15
Gryphaea, Texas	05	15
Terebratulas, Texas	05	10
Fossil Sea Urchins, Texas	05	15
Fossil Screws, Virginia	05	25
Lucina subundata, Bad Lands	10	15
Volsella meki	10	15

Fossil Corals.

<i>Farosit goldfussi</i> , white, extra fine	10	1 00
Birds eye, <i>Arecaularia</i> , polished	10	1 00
Polyp Coral, <i>Heliophyllum Halli</i>	05	50
Chain Coral, <i>Halyssite</i>	10	50
Fossil Fish Eggs, 12 in capsule		10

Choice and Showy Minerals.

Graphite	\$ 15	\$.25
Azurite, Ariz.	25	3 00
Malachite "	25	1 00
" (velvets)	50	5 00
Stalactites, greenish	15	5 00
Rose Quartz	25	50
Lingula Sandstone, choice, selected specimens of Medina Sandstone, covered with <i>Lingula cuneata</i>	10	2 00
Sulphur Crystals	25	1 00
Iron "	35	75
Fluor "	15	2 00
Rubelite	25	1 00
Medina Sandstone, covered with <i>Fucoides</i> , large specimen for museum	100	10 00
Crinoidal Limestone a beautiful limestone, literally filled with fragments of Crinoid Stems, selected specimens	10	50
Quartz Crystal, fine selected single crystal from Hot Springs, Ark	05	50
Chalcedony, selected specimens from Tampa Bay	05	2 00
Tourmaline	25	1 00
Petrified Wood	25	5 00
Opalized "	25	5 00
Agatized "	25	5 00
Opals, rough, Mex " cut	25	1 00
Pink Garnets	25	2 00
Talc	25	75
Garnet, S. D., large "	25	75
" Alaska, in Matrix	50	5 00
Blue Calcite	25	75
Zincite	25	50
Amazon Stone	25	1 00
Satin Spar	10	1 00
Native Lodestone	10	1 00
Polished Agates, German and Brazilian	25	25 00
Agatized Wood, Arizona, polished specimens	15	25 00

Labradorite, Labrador, polished specimens	25	3 00
Polished Hematite, Isle of Elba	15	25
Polished Amethyst, Brazilian	15	25
Amethyst Crystals, Brazilian or Lake Superior	10	10 00
Bloodstone, Ceylon	15	75
Lapis Lazuli from Chili	25	2 00
Malachite, Siberia, polished	25	2 00
Derbyshire Spar, England	25	1 00
Lava	25	1 00
Oriental Alabaster	25	75
Herkimer Co. Doubly terminated Quartz Crystals	05	1 00
English Calcite, from famous Big-rigg mine, 8 varieties	25	1 50
English Fluor Spar, becoming very rare, various colors	2 00	5 00
Massive Green Fluor from Jeff. Co., N. Y., very beautiful and interesting	10	1 00
Polished Specimens of Tiger eye or Crocidolite	15	2 00
OUR 100 VARIETY MINERAL COLLECTION contains 100 minerals carefully selected specimens, sent at purchaser's expense for \$3, or prepaid for \$3.50.		

Geodes.

Our assortment is very large and complete. Specimens can be furnished in Quartz, Calcite and Chalcedony and weighing from one oz. to 60 pounds. Iowa

05 5 00
5 00

Unmated halves, in hundred pound lots, very fine

5 00

Star Fish, Sea Urchins, etc.

Ophiomustum armigerum, Serpent Star Fish	\$ 35	\$ 1 00
Ophiopholis aculeata, Brittle Star Fish	25	50
Astrophyton agassizii, Basket Fish "Madusa's Head"	50	1 50
Astropecten bispinosus, Chinese Star Fish	15	35
Astropecten aurantiacus, Bay of Naples	05	2 00
Asterias vulgaris, Atlantic	10	2 00
Asterias forbesii, Atlantic	20	1 00
Asterias ochracea, California	35	75
Nidorella armata, Panama	50	1 50
Oreaster reticulatus, Mammoth Bahama Star Fish	35	1 00
Echinaster sensus, Black Bahama Star Fish, unique, rare	25	75
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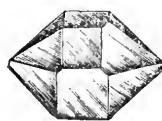
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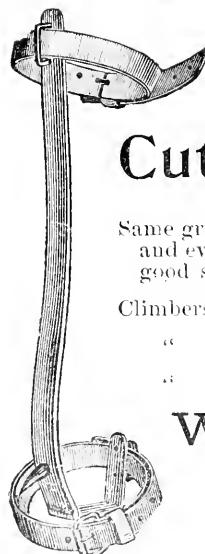
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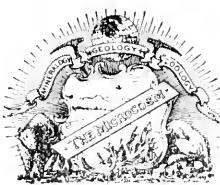
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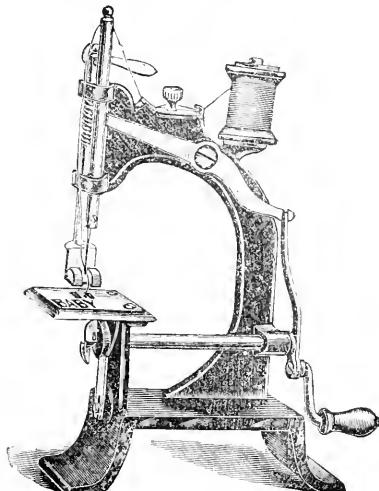
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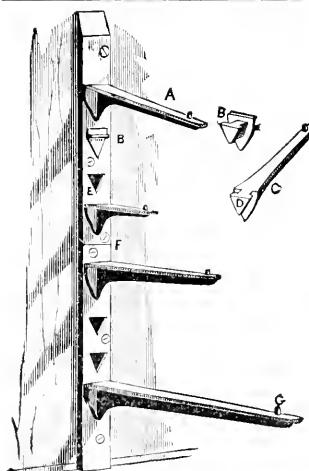


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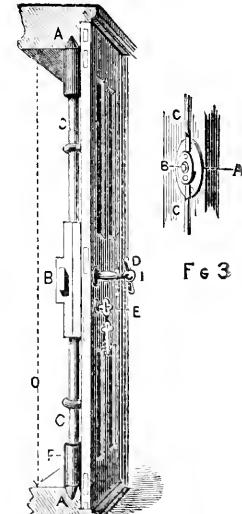
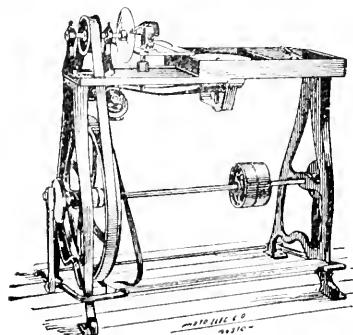


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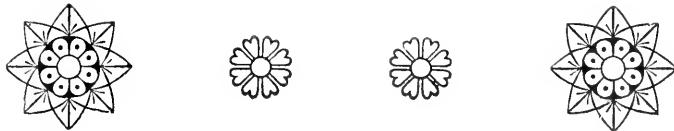


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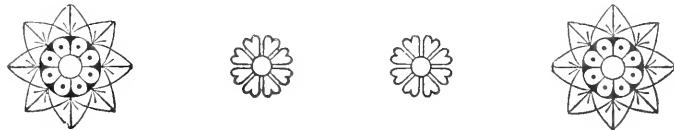
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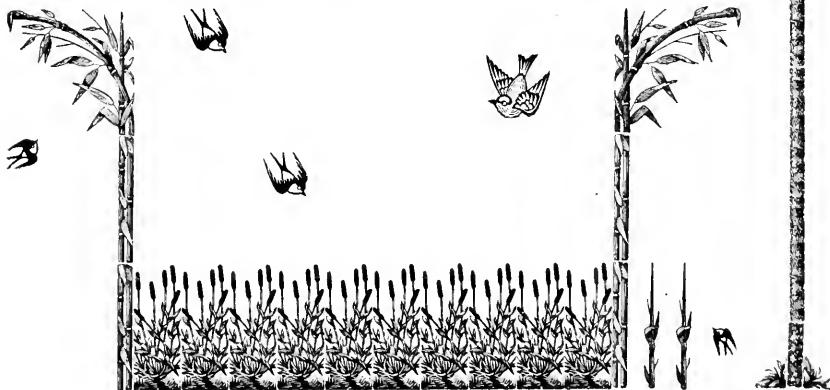


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ARIZONA COLLECTION.—Cactus wood, Apaah Indian relics, pieces of ancient pottery, arrow point and gold quartz. Greater than ever. Sent postpaid for 25c. We also have Indian baskets, live tarantulas, etc. WILLIAMS BROS., Maricopa, Arizona.

FOR SALE.—Coues Key, \$5; By Ways and Bird Notes, \$1; Book of Nature, \$1; Our Wild Indians, \$3.50; Indians of N. A. \$3.50; Camera, \$25; Field Telescope \$2.75; Wall Tent \$8. Write for description. E. M. PARKER, Newell, Iowa.

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THE MUSEUM.

FOR EXCHANGE.—Single barrel shot gun, 40 inch barrel, about 20 gauge. A good shooting gun, for best offer of 1st class single eggs. ARTHUR B. ROBERTS, Weymouth, Medina Co., Ohio.

LIVE RED FOXES. I will pay cash for these animals up to May 1, '96. I shall be obliged for address on postal if you know where there are any kept for pets. Parties that think they can catch them in nesting season address me with particulars. S. C. TEMPLIN, Calla, Ohio.

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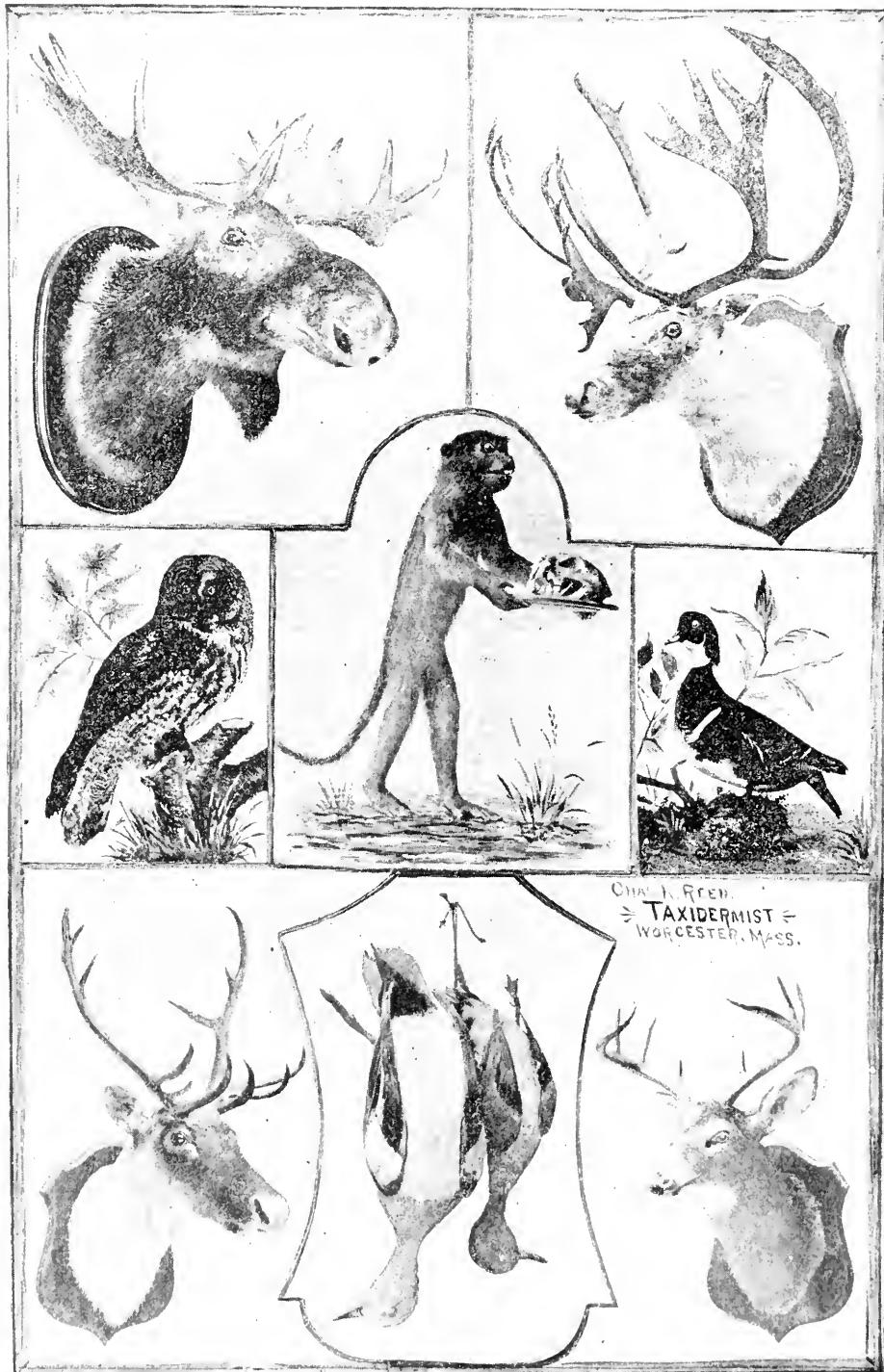
All eggs must be blown through one smoothly drilled hole in the side, and the contents of egg must be thoroughly cleaned out. No end blown eggs taken at any price. *No exchange less than \$1 can be bothered with.* All packages must be sent *prepaid* by mail or express. Where we receive specimens broken actual deduction will be made and full value returned at once.

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Walter F. Webb,
Albion, N. Y.



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THE MUSEUM.

A Monthly Magazine Devoted to Research in Natural Science.

VOL. I.

ALBION, N. Y., AUG. 15, 1895.

No. 10

Two Days Hunt in the Rockies.

Editor of Museum:

On June 25th an old veteran hunter and myself started out from the ranch in search of game, of some kind as we were out of meat, and had been for a few days. In this country all the settlers depend on the game of the country to furnish them with meat. It can be secured at all times of the year with but very little trouble, except in the summer months when it is harder to approach, and always found high up on the Divide). We started up Spread Creek and crossed a large flat, which bears the same name and entered Spread Creek canyon. We saw a large number of antelope on the Flat but they were so wild we could scarcely approach within 500 yards and then at that distance you could only get a running shot at them. Any-one who has ever had the chance knows how difficult it is to kill one of these animals on the run. We rode along the wall on the north side of the canyon, and could look over the edge and see the creek tumbling and foaming over the boulders in its bed. It was a very pretty sight and one that will long be remembered. We were following a trail and did not stop until we had traveled fully ten miles. All of a sudden we came to some fresh elk sign and began looking for the game, but it was no where to be seen and after searching around the quakenasp groves for some time I walked to the bank and looked over. Direct-

ly below me I discovered four fine large bulls lying on a sand bar in the center of the creek. They had gone there to get away from the flies, which are very thick at this time of the year. They were not aware of our presence and we soon decided on a plan to get down where they were. Taking a good look around the trail we were to follow, for any straggler that might be lying apart from this bunch, for we knew if an old cow happened to be near she would run and give the alarm. We started, after satisfying ourselves all was right. We led the horses down a trail to a small grove of timber and after hitching them to a tree took a trail at the waters edge and followed along to a small bend which was heavily timbered with pine. On the opposite side of this we were sure we would find our meat. We got our guns loaded and crept through the brush, knowing it would take considerable noise to alarm them as the creek was roaring around them at a furius rate. We crept to within a few feet of the bank and on looking over saw nothing but the bare sand-bar before us. What a disappointment! On the opposite bank could be plainly seen where they had climbed to the timber above. They were gone and no hopes left of finding them. So we drew back to where the horses were hid. It was about noon and after leading the bronchos to some good feed we took our dinner and went to the water's edge and seated

ourselves on a large flat rock and ate our lunch and talked over the whys and ifs of the luck we had just had. We could not imagine how they had winded danger. Finally deciding they had heard us and started back up the trail, we followed them. When nearly two-thirds of the way up the bank, an elk calf jumped from under a sage bush and with a whistle started down the hill. Here's where the trouble lay. We had looked but not long enough to discover an old cow which was lying a short distance from her calf. He was a pretty little fellow and after looking at us for a moment disappeared in the brush. We then went on for some distance when an elk cow was sighted across the ravine, high up on the opposite bank. I was some distance away and Bill went across. Soon, hearing him shoot, I saw about 50 elk run out of a small bunch of pines and start up the side of a steep hill. Feeling certain my pard had killed one, as he was an excellent shot, I hurried down and crossing the creek joined him and soon found he had his horse mired in a bog close to the edge of the timber and had made a clean miss of it. We found this bunch had made straight up the side of the Mt. Lyda and so gave up the chase. We were then a long ways from home and as Bill's ranch was much nearer we went to his place and arrived there about dark. Being very tired, after eating supper, we retired, intending to try it over on our way home.

Morning came before I hardly realized it and we again saddled up and were soon hitting the trail for Cedar Mountains. We passed through the

Hole-in-the-wall and soon sighted two elk in a small grove, but they had winded us and we did not follow. Passing on to the Buffalo River we looked the slope over for any game that might be in the willows along its bank. I soon heard Bill shoot and on going back found he had killed a fine yearling buck black-tail deer. We dressed it and ate our dinner after which we started for home. Crossing Buffalo Bench several antelope could be seen and before we had crossed had added two fine specimens to our supply of meat. Arrived home early in the evening not entirely satisfied with our hunt, but I felt as if I had had as fine a time as if I had killed several elk. They will soon be coming down off the high points and can then be easily captured.

Aug. 1, 1895.

NATHAN L. DAVIS,
Jackson's Hole, Wyo.

Collecting Eggs of the Golden Eagle.

While spending a winter in the Black Hills two years ago, the writer had an adventure which might prove of interest to those interested in ornithology and its branches.

A cattle man from the foot hill country near Hermosa chanced to come into the bank at H---- City one day in March, and while giving us some bits of news from that region incidentally told us of an eagle's nest that he had passed on his way up to our "camp." He went on to say that the eagles had nested on a certain cliff for some years, and that, owing to the almost inaccessibility of their eyrie, had never been molested. Having

myself once been an egg-collector, I felt quite a return of my former enthusiasm at his account, and determined to try to reach the nest, if only for the excitement connected with the undertaking.

Accordingly I obtained leave of absence for a few days, and having enlisted my friend Mr. B——, of Chicago, in the enterprise, on the following morning we set out for the southern foot-hills and the eagle's nest. We were well provided for all emergencies, having in the buckboard, in addition to a plentiful supply of food and robes, our rifles and revolvers, several hundred feet of rope, a pair of climbing irons and a prospector's bag.

As our destination was distant 35 miles, and the mountain roads, at no time the smoothest, were then badly cut up by spring freshets, we drove through as far as a "camp" just beyond the mountains and "put up" for the night.

The next morning we took an early start, and, with better roads and fresh horses, traveled the few remaining miles in a couple of hours, and about 9 o'clock came in sight of the nest. The "cowpuncher" had, indeed, spoken the truth in saying the eyrie was hard to approach.

A large "butte" rose five or six hundred feet up from the plain, its sides so steep as to be almost precipitous, while on the side nearest, a creek which we had followed for several miles, was a limestone cliff sheer up and down for about three hundred feet. About half way up its face on a ledge, was the nest, a great black object, that contrasted strangely with its yellowish white background.

We took in the situation and naturally decided to ascend the butte to a point directly over the nest. So after unhitching and tethering the bronchos and taking out the paraphernalia, we worked our way around the butte to a side somewhat less steep than the greater part of it, and began the ascent, and after half an hour's stumbling and slipping among the icy rocks, scrub pines and cacti we found ourselves above the cliff, and as nearly as we could judge, directly above the nest. Here, fortunately, the small gnarled trees were thick, affording us a means of support.

In the meantime we had only noticed one of the eagles, a monstrous bird, that slowly sailed around only a little above our heads, but had as yet showed no sign of hostility. My friend now proceeded to tie one end of the rope securely around my chest; then, running the other end around a stout scrub, he braced himself firmly and stood ready to "pay out" the rope as needed. Thus secured against any probable accident, I carefully made my way down to the edge of the cliff and fired my revolver. Directly the other eagle came soaring out from the cliff and began circling around, giving vent to shrill screams or whistles. We both now concluded that probably the birds would not venture to attack us so B—— got ready to lower me over the edge. If the birds should not prove hostile everything pointed in success, for Mr. B—— is a man of great strength and the rope was warranted. So, first seeing that my bag was secured, and revolver in easy reach, I gave him the word and in another moment was dandling in the air.

I at once found that the cliff shelved in almost from the top, and as in most places I could not touch the rock, I soon began to spin around slowly, which did not add to my comfort. I shall never forget the first sensation of the moment. Though I was positive that there was little or no absolute danger, yet I was in some way far from feeling secure. Suppose the strands of the rope should wear away by the friction against the sharp edge of the cliff, or that in some way B—— should for a moment lose his hold, or if this or that——and then I would "brace" and try and think of something else. First, just the bare wall of the overhanging cliff and then a momentary view of the surrounding country below and then a hurried look below me where I now caught glimpses of the nest on a broad flat ledge still some ways down. Thus, I must have gone down a hundred feet, and was just congratulating myself upon an approach to at least temporary safety, when I suddenly heard, close at hand, a tremendous flapping of wings, and the next moment I received (so it seemed to my excited senses) at least a score of heavy blows on the head and shoulders, accompanied by several fearful scratches upon my head and neck. I had been holding the rope with both hands, but now, instinctively I ducked my head under one hand and arm and with the other grabbed my revolver. I dare not look up, but realizing my somewhat dangerous position, I swung the revolver, butt end up (and it was a very heavy one), violently back and forth above my head for a moment, receiving at the same time a blow on the hand from one of the eagle's talons.

This proved to be the best move I could have made, for it drove them back, and looking carefully up, I took a hurried aim and succeeded in "dropping" one of the birds, which frightened the other one away.

Meanwhile, my friend, ignorant of the true state of affairs, had continued to lower me, and just as I terminated this strange encounter, I felt my feet touch the ledge, and after resting a little, I worked my way along to the nest. It was a huge affair, fully three feet high and as many in diameter, and was constructed of sticks of various sizes, some of them as thick as one's wrist, but dwindling in size to small twigs at the top. It was almost flat, scantily lined with pieces of bark, and feathers from the breast of the female bird, and contained the eggs. The eggs, fine specimens, which I have still in my collection, measured 4 1-2 x 2 3-4 inches, and were of a cream colored hue, irregularly marked with reddish-brown blotches. Well to bring the story to a close, after securing the eggs I gave the signal to be raised, and finally reached terra firma once more. But a sorry looking sight, with coat and collar soaked with blood from the scratches on my neck and head, and large strips of skin torn from my hands. After this we soon made our way down the butte and secured the eagle. It proved to be a fine specimen of the Golden Eagle, well marked, and measured 7 feet 10 inches from tip to tip. Then starting for home, we reached the "camp" just after dark, tired and hungry, but well pleased with our two days' outing among the "foot-hills." —*J. D. Gorham in the Naturalist and Collector,*

THE CLEBOURNE COLLECTION.

Another Omaha, Neb. Collection. FOR THE MUSEUM.

Mr. William Clebourne of this city recently presented to the Omaha Public Library one of the finest collections of fossils in the west.

The collection consists of Silurian and Tertiary Platte Valley specimens, most of which were secured along the line of the Union Pacific Railroad.

The following is a partial list:

Paleozoic Fossils, from lower silurian of Cincinnati, Maine plants, corals, crinoids, trilobites, shells, etc., from upper silurian of Illinois and Wisconsin, principally corals, crinoids and brachiopod molluscs; Devonian from Kentucky, Indiana, New York, and Iowa; corals, brachiopod shells and trilobites; carboniferous from Pennsylvania, Missouri and Nebraska, including a large variety in the vicinity of Omaha; land plants, ferns, lepidodendrids, sigillorids and asterphyllitids, corals, starfishes, trilobites, brachiopod, gasteropod and other molluscs, ammonites.

Mesozoic Fossils: Jurassic, from Rocky Mountains of Wyoming; mollusca shells, belemnites, sharks' teeth, etc.; cretaceous from Colorado, Wyoming and Utah; remains of faroid "halymenites," a large variety of lamellibrande, gasteropod and cephalopod molluscs, including baculites, belemnites, scaphites, ammonites, etc., etc.

Tertiary Fossils: Eocene and Miocene; numerous ferns, palms, conifers and dicotyledoneous tree; remains of insects, fishes, turtles and mollusca.

Past Tertiary Fossils: Tooth, Tusk and Bones of Mastodon from Platte and Snake River Valleys.

Mr. Clebourne first commenced collecting and studying in 1868 while employed as engineer for the U. P. Ry. Co. and the collection has gradually grown since that time until it now is a monument to the energy and perseverance of its donor.

ISADOR G. TROSTLER,
Omaha, Neb.

Changes in Land and Sea.

(CONTINUED).

We see small changes taking place every day. Perhaps we live near some stream, and observe daily the water undermine its banks, and even change its bed; we see trees fall, one after another, and each taken down by the current but we spend little or no thought upon the matter, we are apt to look upon it as a mere local occurrence, deserving of little or no notice; we forget that the same ever working power is doing the same thing in every river and streamlet in the world, and that the single change, although apparent, is to us insignificant in itself.

To show the peculiar manner in which currents of water act in the formation of sedimentary deposits I would refer you to the changes which have taken place at different times in that well known Yorkshire river, the river Humber, (upon the shores of which I spend the greater portion of my life—the happiest perhaps) which will illustrate to a great extent the proof going on, on a larger scale, in other parts of the world.

For a considerable time an island

formed by the accumulation of mud deposited by the waters of the Humber, just opposite to Brough, on the Yorkshire coast, which was about 500 yards long and contained about 100 acres. At low water cattle were driven upon it from the neighboring shore, and it afforded good herbage. In 1846 a commissioner upon woods and forests was directed to inspect it with a view to reclaiming it. It was found, however, from some change in the current that it was gradually disappearing again, and in four months the whole island had gone, leaving on its site a deep channel. As this island disappeared it was found that an immense bank was forming on the other side of the channel; and this bank had scarcely risen above the water than it again began to disappear, and in 1863 the other island reappeared on its old site. Another island on the Lincolnshire side of the Humber is now in existence, which has arisen from the same cause, and consists of about 300 acres, and is much used for grazing. An island called Lunk Island, a few miles from Hull, Professor Phillips tells us, has been formed from the loose salt taken so extensively by the sea from the Holderness coast. It is now a parish and is extensively inhabited and has an area of 7,000 acres. It was first formed as a sandbank, and soon became a small island. It became joined to the mainland by the accumulation of river deposits. In the time of Charles the First the island contained only seven acres, and then was a mile and a half from the Yorkshire coast. At the present time there are other accumulations forming amounting to 3,000 acres, making a grand total of 10,000 acres, and Mr. James

Oldham, C. E. the commissioner, reports that the deposit is going on so rapidly, that the portion of the extension lying on that part of the Humber will be reclaimed and rendered available for agricultural purposes.

If we take a walk along the muddy banks of the Humber from Trent Falls to its mouth, only a very few miles, how many of those little towns and villages mentioned by our old historians and chroniclers have been swept out of existence by that great intruder upon the coast—the sea. Ravenspurne, Ravensrod, Upsall, Redmore, Tharles Thorpe, Potterileet, Hyde, Auburn Winkton etc., etc. All those were once known as ports, towns and villages, but are now covered by the relentless waters under which they at present rest.

Ravenspurne, the most noted, and mentioned by our great dramatist and poet, Shakespeare, has a most remarkable history. Mr. Thompson, in a work called *Historic Facts*, tells us "that the short space of 150 years witnessed its origin, its celebrity as a seaport, its final destruction by the encroachments of the sea." It was originally a small island formed by an accidental accumulation of sand and stones in the reign of Henry the Third. At first it was only used by fishermen to dry their nets upon. In the reign of Edward the First it assumed the appearance of a commercial port, and obtained a charter to hold fairs and markets, that was in 1299. In the year 1355, the Abbot of Meaux was ordered to gather up the bodies of the dead in the churchyard, which by reason of repeated inundations were then washed up and uncovered, and to bury them in the churchyard at Easing-

ton. In 1361, the inhabitants were compelled to remove from the place, and in 1390 there was no trace of the place left. It is well known that after the Norman Conquest, Holderness on the East coast was represented as an island. Mr. Walton in a work called *Loose Leaves from the History of the Humber*, says "that the villages of Paull, Kelsey, Dimlington, and Keyingham, once formed a cluster of islands far to the South of the Yorkshire coast, whilst north and south for miles around the present Humber, the waters extended, and in later times the spaces were filled up, and formed the district called Holderness."

Ravensrod was a neighbor and offshoot of Ravenspurne. It occupied a long, low islet, which was accessible from the mainland by a flat ridge of sand and pebbles. We read of its having been, 500 years back, a flourishing seaport, eclipsing its progenitor, and also exciting the jealous attentions of the "good men of Grimsby on the opposite bank." In the time of the second Edward it was deemed of sufficient importance to attract the Royal attention, and to bring down upon itself, in consequence of that attention, the inevitable demands for a ship, together with men, arms and provisions. But the great intruder, the sea, swept it all away after an existence of about half a century.

Hyde or Hythe it is spelled both ways), appears to have been a well-to-do fishing village—at least we may reasonably suppose so, from the fact that it paid as much as thirty pounds per annum to the Monks of Meaux Abbey, as its tithe for fish. The whirli-

gig of time, however, brings round its revenges, and the fish at length

the burghers dispossessed

And sat, not as a meat, but as a guest.

With numerous churches on the coast the turbulent waves have played especial havoc, and many a parish fane has succumbed to their assaults. Kilnsea Church was one of the last washed away. The sea sapped and undermined the eminence on which it stood, so that the building quivered under the shock of the waters. Service, notwithstanding, was held in it up till 1823, and was then discontinued only because the building showed unmistakable symptoms of a speedy dissolution. The walls cracked, the floor subsided, the windows broke, the sea-birds flew in and out, and made their nests inside. Half of the church fell into the sea in 1826 and five years later the other half followed. As the sea is gradually gaining ground in the neighborhood of the cliff on which the church stood, the houses, of a necessity, became abandoned from time to time. At one point 43 yards of land have been swallowed up in six years. The average annual decrease along the coast is two yards and a half.

CHAS. T. WHITING,

Montreal.

[TO BE CONTINUED.]

The Florida Gopher or Land Tortoise.

BY CHARLES H. COE.

The term gopher was first applied by the early French settlers in Canada to such reptiles and mammals as burrowed in the ground, and it is still in use to distinguish the pouched rat or pocket gopher and the ground squir-

rel, besides the subject of this paper and two other species of land tortoise.

The Florida gopher or land tortoise (*Gopherus polyphemus*) averages about eleven inches in length by five in height. Like other burrowing animals it excavates a dwelling place in the earth, the spot chosen being a sandy tract elevated somewhat above the surrounding country, such as the high pine or scrub lands so common in Florida. In such localities the earth is composed almost entirely of pure sand, free from all obstructions except occasional roots of the pine, or the scrub oak and the saw palmetto.

Here the gopher in its early life excavates a small hole, which it inhabits and enlarges as it grows, until finally it extends, at an angle of between 30 degrees and 40 degrees and in a straight course, to a distance of ten to twenty feet underground. In this habitation it lives year after year for upwards of a hundred years, some think all of two hundred years, for their tenacity of life excels that of most other animals. A pair, male and female, occupy the abode together, and rarely change it for another, not even when the settler clears the surrounding land.

The animal seems to have no natural enemies to destroy it; with the rare exception of death by forest fires, it probably seldom succumbs to anything except extreme old age.

When the young gopher is not over two inches in length—about two years of age—it is often living in a dwelling of its own construction. It is interesting and amusing to watch one of these baby-like artisans as he enlarges or cleans out his retreat. They are all—both old and young—quite shy, but by

keeping quiet their interrupted operations will presently be resumed. The little ones are rarely seen at work, however, owing to their small size and color which latter very closely harmonizes with that of the surrounding dead grasses and leaves. A young one occupied a sandy ridge near my place for several years, and I thus had a good opportunity to watch it. Its growth was extremely slow, in fact I could never feel quite certain that he had grown in the least in all the time I knew him. The young occupy separates holes alone until they are old enough to pair.

The fore feet and legs of the gopher are admirably calculated for excavating. From the first joint to the end they are considerably flattened and flipper-like, and provided with five sharp toe-nails. The flippers of the true aquatic species are fashioned mainly for locomotion, but the flipper-like fore leg or arm of the gopher is made almost solely for digging in the earth. Thus, when the gopher walks, the nails and the extreme end edges only of the fore feet rest on the ground, and are used in a most awkward manner. On hard ground the imprints of the nails alone are visible; in fact the edges of the feet do not reach the surface at all.

It is different with the hind legs and feet, however; they closely resemble those of the elephant, and are used mainly for walking and pushing, being united in a general mass to the toe-nails, which latter are flattened and about one-fourth of an inch in length. The animal's main powers of locomotion rest in these members, the fore legs being used more for holding the body clear of the ground than for very

materially assisting in propelling it along.

The strength of the fore legs is remarkable, and with their other perfect adaptation explains the ease with which the animals excavates and makes the sand fly. The muscles of the jaw are also wonderfully powerful, enabling the gopher to hold fast to an object grasped with all the well-known tenacity of the bulldog.

Like all members of the order to which it belongs, the gopher is without true teeth, but the bony ridges along the margins of the jaws are serrated and very hard, answering the same purposes. It feeds entirely upon grasses and herbs and the leaves of certain plants. They are extremely fond of the leaves of the sweet potato plant; if they can get into a field of these—which seldom happens—they do considerable damage, following the rows and denuding the vines of leaves.

The gopher rarely if ever leaves its retreat at night, and does not commonly go out to feed even in the daytime until the sun is high in the heavens, usually about noon. The animal can go for long periods without food, in cold weather only foraging on warm, sunny days, and in rainy weather seldom going abroad. Its flesh resembles beef somewhat, and is highly esteemed by some Northern residents of the State. I never knew a native to eat the meat, however.

When speaking of the gopher's tenacity of life, I omitted to say that it is very hard to kill. I have known the animal to walk several yards after its head had been cut off. Vivisectionists have proven that the heart of a land tortoise will beat and the blood

circulate for as many as twelve days after the head has been removed.

The movements of the gopher are slow and cautious; indeed, speed would be almost useless to it. His impregnable covering, into which he withdraws his head and limbs when danger threatens, completely protects him against his would-be enemies, with one exception. When at a distance from his retreat he cannot escape man; but then, from the inoffensive character of the animal, and its utter uselessness to any one except those who have acquired a fondness for its flesh, man seldom molests it.

Sometimes a fire in a thick scrub or among fallen trees which is of greater intensity and duration than the ordinary fire in the open pine woods, where the gopher usually lives and moves) overtakes and destroys him. But their hold on life is so great that they sometimes escape from even these fierce ordeals, but seldom without scars. I have encountered several with only three legs, one having evidently been burned off, and with it a portion of the shell.

The animal has a perfect abhorrence of rain, and usually takes warning in time to enter its hole long before the drops begin to fall. Like our weather prophets, however, he sometimes "misses it," and is overtaken and drenched while out foraging. At such times, or on the rain's near approach, he makes all possible haste by the shortest open route to his home.

Their comical appearance and plainly evident haste, with head protruding far out from the shell and legs trudging as rapidly as their awkwardness will allow, have caused me to burst into a hearty laugh on several occasions

when I have chanced to meet them under the above circumstances.

On a number of occasions I was an interested witness of the gopher's mode of depositing its eggs for hatching. I was first led to watch the animal by its strange actions. It appeared to be scooping out a hole within two feet of the entrance of its retreat, and directly in the pathway descending to it. Going nearer, I saw that it was actually doing this. After digging a hole about five or six inches in depth, it commenced depositing its eggs therein, half a dozen in number, which had a hard shell and were round and white.

After each egg was deposited, the animal would cover it with a layer of sand, which it scraped into the hole with its fore feet; with its elephantine hind feet it would then tread the earth down. When the last egg was laid, it carefully smoothed the place over, and they were left to be hatched by the sun. During the laying I carefully approached the spot, and was surprised to find that the animal, naturally shy and easily alarmed, paid no attention to my presence as a spectator.

The gopher is not the only occupant of his dwelling place; he shares it with two other creatures—a frog, commonly called a "gopher toad" and the dreaded diamond rattlesnake. The frog is often seen sitting at the entrance of the place; on your approach, he quickly disappears with one great leap down the dark cavern.

It is commonly reported that both the frog and the snake are permanent residents with the gopher, and I believe this to be true. The serpent, the largest of the genus, is quite often seen coiled up on the mound near the entrance, evidently for the purpose of

sunning itself. On many occasions I have found it thus; on becoming aware of my presence, his snakeship would slowly and majestically crawl down the hole out of sight.

On one occasion in particular I saw an uncommonly large snake of this species disappear down a hole. Wishing to secure it for preserving among my other specimens, I stopped up the mouth of the hole with pine knots, and then went to the house of a friend for a shovel. My friend became interested, and together we repaired to the place and commenced digging. After a very laborious task, we reached the end of the gallery, where the rattler was coiled in readiness for one of his fatal springs. We finally drew him out by placing a noose over his head.

I once had a pointer dog that contracted the habit of searching for gophers. Having found one of their retreats, he would watch near by until the gopher left it about noon to feed. As soon as the animal was well away from the entrance, "Doc" would rush upon him, and by furious barking detain him until some one came and secured the "game."—*Popular Science News*.

Giant Kites for Scientific Purposes.

Ten giant kites, all on one string, will be flown, if possible, to the height of two miles, by the Weather Bureau authorities at Washington. This, of course, would be many times higher than any other kite has hitherto traveled, the famous Eddy kites having flown only 4,000 feet, according to latest reports.

This will be done in connection with systematic studies of the upper atmosphere, which region has heretofore been explored by scientists only with the aid of captive balloons carrying thermometers, barometers, etc. But balloons are found to be most impracticable for such purposes, since the wind blowing against them keeps up an almost constant vibration, while its force against their envelopes causes great leakage of gas, and hence makes a flight of many hours impossible.

The kite experiments to begin this summer will be conducted by Prof. Adie, the same meteorologist who is making extensive photographic studies of lightning flashes. The investigation of the upper atmosphere will be made first, with a view of ascertaining the differences of temperature for various altitudes in free air. Other experiments, by aid of the kites, will follow these, all of which are expected to enable the bureau's meteorologists to make a great profile map of the atmosphere, which task has never yet been accomplished. Temperature and barometric curves, electric currents, etc., will be located for various parts of the country and for different seasons of the year.

Such data will be as necessary to the engineers of flying machines, when practically perfected, as charts are to sailors. Balloning can be then carried on with much less risk than at present, since it will be an easy matter to determine what currents of air are likely to be met at various heights, just as it is now a small task to find the Gulf Stream or the trade winds. A still greater service will be rendered by this information to scientists, who

now believe that men will be able to soar like birds as soon as the upper air currents are definitely understood.

Kites will be flown to different heights in hot waves during electric, wind, or rain storms, in cold waves during snow or hail storms, and in fact during every possible phase of weather. It is now the purpose of the experimenters to construct this summer a giant kite, which will revolutionize the whole science of kite-flying. This will be no less than a combination kite balloon. The length and width are not yet determined but in form it will be a large, flat box, about a foot in thickness, the light frame being covered with gold beaters' skin. It will be inflated with hydrogen gas, which would give to a kite of the dimensions of the present design and a foot thick a lifting force of three pounds. This would be sufficient to take the kite up, notwithstanding the general buoyancy offered by the wind currents.—*Washington Star.*

A Northern Scientific Expedition.

The steamer Portia sailed from Brooklyn, June 22, carrying an expedition under Emil Diebitsch which will proceed to Lieut. Peary's headquarters in North Greenland and will bring him and his small party of explorers home. The relief party is composed of Prof. Rollin D. Salsbury, of Chicago University, Theodore Le Boutillier, of Philadelphia, John E. Walsh, of Washington, and Prof. L. L. Dyche, of the Kansas State University.—*Scientific American.*

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A Monthly Magazine devoted to Ornithology, Oology, Mollusca, Echinodermata, Mineralogy and Allied Sciences.

Walter F. Webb, Editor and Pub'r, Albion. N. Y.

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NOTES.

We again hear from Mr. Davis, formerly connected with our establishment but now at Jackson's Hole, Wyo. He writes that he has only just recovered from a three weeks' battle with the mountain fever. From the fact that he never once mentions "Injuns" we infer that the recent outbreak in that territory has been mostly newspaper talk.

If you receive a copy of this number and haven't yet sent in your subscription, don't delay it any longer, but accept offer in last number and write at once. We have been generous in sending you samples but this can't continue always.

Mr. H. C. Higgins of Cincinnati, N. Y., is chairman of the nesting division of the Wilson Ornithological Chapter of the Agassiz Association. This chapter is doing excellent work, as will be seen by the extracts from a paper entitled "The American Crow" prepared by F. L. Burns, which is printed in this issue.

We have been greatly gratified by the results of the premium offer made in the July number. There still remains time to accept the offers therein made. "A word to the wise, etc."

During the month we had a number of calls from naturalists in various parts of the country among which were Messrs Slayton of Graton, Mich.; C. Cliff, Murray, N. Y.; G. X. Buffington, Knapps Creek, N. Y., etc.

Our photo engravers gave us the slip this month and hence we are without illustrations. They will surely be ready for Sept. number.

Sensitive Movements of Plants.

Dr. J. M. Macfarlane publishes the results of a series of experiments on the effect of colored screens on the sensitive movements of leaves (*Oxalis stricta* and several species of *Cassia*). He finds the exciting agents of the movements to be certain of the light rays. When sensitive plants are placed behind colored screens, the leaflets fold up as in the nyctitropic state, most strongly under red, less so under yellow, only feebly or not at all under green light; while under blue screens the leaflets remain open as in ordinary daylight. In all cases nyctitropic

movements are accelerated behind a red screen, not quite so strongly behind a yellow screen, while behind a green screen the movements practically coincide in time with those of exposed plants, and are beautifully regular in sequence; under blue light there is a distinct retardation of the normal nyctitropic period. Up to 38 degrees C., or even 43 degrees in some species, heat rays appear to fail in stimulating the tissues. The general result of these experiments is that the heat rays, the less refrangible rays, and the more refrangible rays, are all efficient up to a certain point in inciting nyctitropic movements. Orange, yellow and green screen to the protoplasm, whether in the form of pigmented walls, pigmented cell sap, or chlorophyl, are of a protective character, and permit the normal functions to be carried on unimpeded by the injurious action of the more intense blue-violet rays.—*Popular Science*.

An Hour With Baird's and Leconte's Sparrows Near St. Louis, Missouri.

BY O. WIDMAN.

Richfield, St. Charles County, Mo., is a station on the Keokuk and Northwestern R.R. 40 miles northwest of St. Louis. I do not know who gave the name to the station, but presume that it was an ornithologist, since the vicinity is an exceedingly rich field for the study of birds. Oct. 13, 1894, I identified 55 species and added 15 more the next day. In these two days I had gone over only a part of the ground, mainly the wooded portion, adjacent to Cuivre River and Horse Shoe Lake. The marsh had not been

explored. To do this I returned on the 18th, or rather, I was on the marsh before daylight, watched the meadow-larks, the Cedarbirds, the Robins, the Blackbirds and Ducks leave their roosting places in the marsh; and it was here at the border of Mud Lake that I found the Baird's Sparrow, two individuals, in company with other Sparrows, mainly *Ammodramus* and *Melospiza*.

Not being a "shootist," I cannot lay the bird before you. I have to beg you to accompany me into the field to the scene of the encounter. Mud Lake is one of a series of marsh lakes, all of which are more or less connected by sloughs and are the common receptacle of the precipitation in the surrounding country. In times of high-water in the Mississippi River the whole system is filled by backwater, pouring in through the Cuivre River and overflowing the marshes, which are on that account not cultivated, except the highest levels, forming islands in the ocean of grasses and weeds which grow in profusion. Parts are used for pasturing, and the whole landscape is richly dotted with trees, singly and in groups, mostly pine oaks and honey locusts, with clusters of persimmons, which, shooting up as thickly as weeds, are a peculiar feature of the landscape.

It is seven a.m., and the point of observation is a clump of locusts at the southeast border of the lake, so as to have the sunlight in the back. It is well to be in the shade: the October sun is pretty warm even at this early hour. We had 80 degrees F. yesterday and today promises to be still warmer.

Mud Lake, as the name implies is not more than knee-deep, but last month's rain caused a rise of six inches, and the water now covers about 200 acres. It is entirely overgrown with spatter dock in the deeper places, with smartweed in shallower water, and all around its edge for a varying width. Encircling the regular expanse of water is a fringe of low willows and elbow wood, mostly dead and crumbling, killed by fire some years ago. In back of the willow fringe begins the endless ocean of marsh grasses, mainly *spartina cynosuroides*, growing on damper ground as high as six feet; in drier situations it is lower, and in some is entirely overgrown with boneset and a few other weeds, mostly of the family Compositeæ.

A second circle of tree-growth, back of the willow circle, is composed principally of honey locusts, which are at this moment very conspicuous objects all over the landscape through the golden yellow of all their leaves. The pin oaks are still green, with only the tops and outer tips of branches turning crimson, affording quite an ornament to the monotony of the marsh, which has at present a sombre yellow cast over the higher grasses while the predominance of *Eupatorium* covers the lower grasses with a hoary mantle. The smartweed region is still green but with a strong admixture of yellow and brown shades. The shriveling spatter docks form a sadly withering, shapeless mass of gray and brown tints, though partly trampled down by cattle and thus exposing large patches of open water. The lake is on club grounds, but in hot weather duck shooting is at a discount, and in

days like this, when no hunter appears on the scene, we and the birds have the ground all to ourselves.

The air is filled with bird voices; the Blackbirds are seen and heard in all directions. What would the marsh be without its Blackbirds? A dreary ocean of monotony! With them all is life, ever-changing life; a constant coming and going, a uniting and separating, now here, now there down on the ground, high in the air and even on the lake itself; and withal a kaleidoscopic frolic, produced by only a small variety of individual sounds, perhaps not more in number than the letters of our alphabet, but through their endless and ever-varying juxtaposition, creating a medley of indescribable and unique grandeur.

Just back of us in the persimmon patch there is as busy an army of feeding birds as can be found; they are on the ground, almost covering it. Every now and then, without apparent cause, all go up in a body—and what a cloud they make! They are all Red-winged Blackbirds, old and young, but those in spotted garb outnumber the red-shouldered black as ten to one. The persimmon fruit is now ripe and ready to drop. The whir of the hundreds of wings is heard only for a moment; after a beautifully executed turn the cloud settles on the now leafless trees on which some fruit is still hanging.

Probably the whole manœuvring is carried out only for the purpose to shake the fruit from the trees; the last has hardly settled in the trees when the first already begin to descend, and soon all feed eagerly on the sweet and succulent persimmons lying on the ground.

At once there is another rustle of

wings and all go up into the trees. A young Redtail approaches and settles right in their midst. Not a single one of the Blackies leaves the trees; the only precaution they take is that they gain a position above him. They are evidently not a bit afraid of him. His eyes are fixed upon the ground beneath, but he does not find there what he is looking for. The Redwings have monopolized the persimmon grounds to the exclusion of fur-bearing lovers of the tidbit.

From dozens of happy throats comes the pleasing song of the Meadowlark; they seem to take now the leading part in the concert, which the Robin had a little earlier in the morning. Into the tree above us a party of Goldfinches drops for a minute. They rest, but only their wings rest; the tongues do not rest, and though there are only a dozen birds overhead, one could think there were several scores of them, every one saying something pleasant.

Now a great big bird lazily wings its short way across the spatter docks and alights about 200 yards away in the smartweeds. It is a Bittern, and for fully three minutes the cautious bird never moves a muscle; with long, out-stretched neck, and with bill pointed skyward, it stands immovably erect until it stoops down into the weeds and disappears. This seems to be the signal for his comrade to join him, and following in the same track through the air, he alights at the same spot.

All the while, since we are here, the border of the lake, the oozy region of the willows and elbow wood, has neither been deserted nor neglected. When we came we found a number of

Savanna Sparrows, all dark-spotted birds with rich yellow suffusion about the head. There are several Swamp Sparrows scattered along the edge of the water, and we are treated to a few fine recitations by the Song Sparrows behind the curtain. A Lincoln Sparrow slips stealthily through the debris at our feet and a Snipe, the beauty of whose plumage can never be appreciated after death, nimbly runs away a few yards, sits deliberately down on the oozy ground and for a moment seems to consider the possibilities of escape. Having the example fresh in mind, we also play the Bittern and soon have the satisfaction to see our beautiful Longbill resume its wonted occupation until, frightened by the sudden appearance of a Coot in the smartweeds near by, it jumps into the air and with a nasal sound of leave darts into space unknown.

What is this, sitting in the willows in front of us? We see its back only, but this black-streaked head above a peculiarly yellow neck looks very suspicious. Have we not been looking out for such a distinctly marked bird for a long time? Should it be Baird's Sparrow? What else could it be? Look at the fawn-colored rump, the plain unmarked area reaching high up; indeed, the spotted area of the upper part being more like a saddle, hardly more than an inch in width, all the rest of the upper part being a brownish-yellow of such a peculiar warm tint, that it has no equal. The tail is blackish and slender. Now, how obliging! It hops to another twig and presents its underparts in all their characteristic beauty: A pure white with a collar of real black adorning

the breast in the form of a V; only a few spots on the sides, thus leaving the area above and below the collar a pure white, upon which the pink feet appear in sharp contrast. The bill also is pink and there is only a light streak of brown from the bill down. The dark eye protrudes directly from the yellow face without the least orbital mark, but behind the cheek there is a small wedge-shaped spot of warm brown pointing from the eye. The black crown streaks are seen now in all their characteristic marking.

Whea the bird thought the sitting had lasted long enough to afford me a good likness, it disappeared, not to be seen again, but following the water's edge a second one came into view, flying up into a willow. The post-auricular spot, in the other faintly indicated, was here well pronounced and large, but the breast-band had less continuity, especially the meridian spots were smaller.

Sitting on the branch, its upright carriage and general contour reminded me of *Zonotrichia leucophrys*, the difference in size being hardly appreciable. When a general stampede of the frightened Fringillidae occurred, this bird joined the rest, alighting repeatedly in willows until lost to sight. While still on the lookout for other members of the noble Baird family, I wondered whether a bird so peculiar in color and marking may vary at different seasons so much that it could be described in books with introductions like "with a general resemblance to Savanna."

But the field is not the place for studying book-descriptions, and the constant changes which go on before our eyes soon absorb our entire atten-

tion. The Grackles, all pure and simple *ancus* as far as we can see, are paying an interesting and interested visit to the top-shaped receptacles of the spatter docks, from which the nuts have fallen, thus affording splendid lurking places for different forms of lower animal life. It is a pleasing picture to see the glossy, graceful birds alight on such a curious perch and bending down peep into every nut-hole.

A flutter of dark steel-blue wings set off against a reddish-gray body and a part of Rusty Blackbirds alights in the button-bush nearby. They came to rest, and soft, melodious notes escape their throats, as if dreaming of times gone by and places far remote. One has spied something in the weeds below and, hanging Oriole-fashion from the lowest branch, dips down its head and body for a moment and emerges with a big dragon fly, which it soon dispatches wings and all.

A fine old Marsh Hawk, in blue and reddish apron, who has been overhauling the marsh with untiring wing ever since sunrise, pays a flying visit to the lake, but the birds do not mind him much; all seem to be on friendly terms with him. Six Mallards which had been lying still amidst the sheltering plants go up with tokens of surprise and swinging around are heading for Horse Shoe Lake, two drakes in front, the females closely in pursuit. A solitary Purple Finch alights in the tree over our head, gives half a dozen calls, a few strains of music, and proceeds. The Savannas which we found along the lake on our arrival have long since disappeared among the grasses of the marsh, but the Swamp Sparrows are getting quite familiar. They are

well dressed for this time of the year, bright chestnut and blue-gray colors in conspicuous places, but the bright red cap which they donned before departure in the spring must have been left behind somewhere in the neighborhood of their nests.

From the direction the Mallards took comes the report of a heavy gun, and the Mallards come flying back in haste, but there are only five of them.

In the locust over our head a most startling outcry is now heard, almost like a chicken in great distress. It is a Shrike, which therewith calls the attention of its mate to the hidden foe beneath, saying, no doubt, "Be on your guard, there is one of those monstrous gum-boots who carry thunder and lightning into our tranquil habitation, and shed the blood of the innocent wherever they go." *Kri kri* comes from the neighboring tree, meaning clearly: "I see him, I keep an eye on him; better let us go;" and off they go.

Turning away from the lake we follow the slough, a narrow ditch inclosed by a wide border of flags, several feet high, deep green below; but cinnamon on the tips. This is the home of the Marsh Wrens, and one, with a conspicuous superciliary, almost white and sharply contrasting against the plain dark pileum comes up into a bush and sings its simple tune, keeping time with the tail, which goes rhythmically up and down. Several more of the Longbills come into sight but only one of the little Shortbills has the courage to show its streaked head above the sheltering flags.

Since we advanced through the high marsh grass, many small birds have jumped out, not exactly from under

our feet, but within two or three yards, and after a short, nervous flight, in which they alternately spread and fold the pointed tail-feathers, sink down and out of sight among the wavy yellow blades. Although the flight is short, a quick and practised eye can catch the yellow hue of neck and head and, together with its diminutive size, we know him well,—it is our friend the Leconte Sparrow. But presently we shall be treated to a novel sight. Five of the beautiful creatures adorn the leafless branches of a little hawthorn tree, eight feet in height and raising its head only a few feet above the tips of the surrounding grasses. A sixth one comes up to take a seat; it is now their time to take an airing and a sunning, the only hour of the day when they remain exposed to view for any length of time. We pass a few more of these isolated thorn-trees, standing in line like sentinels along the slough, as if to keep the flags from marching upon the domain of the grasses. Each one has at this hour a small contingent of Lecontes, who after paying a visit to the watery region of the flags return to dry and preen upon the branches. But our hour is over.—*The Auk, July, 1895.*

The American Crow.

NOTES ON ITS HABITS: NOTABLY FEEDING,
NESTING, ROOSTING, FLIGHT, RELATIVE
ABUNDANCE, ETC., BY VARIOUS OBSER-
VERS IN WIDELY SCATTERED LOCAL-
ITIES.

Extracts from Bulletin No. 5, of the Wilson Ornithological chapter of the Agassiz Association.

"*Corvus americanus* is found throughout the United States with the exception of Southern Florida, where it is replaced by the sub-species *floridanus*; and the Central Plains and

Southern Rocky mountain regions, where the American Raven (*Corvus corax*) abounds."

More or less abundant where-ever found as a resident or as a migrant, with but one common name, it is perhaps better known to a larger number of people than any other species indigenous to North America.

Held up as emblematic of the fallen, defeated, or unfortunate, the embodiment of cunning and cruelty, and published throughout the land as the personification of a knave and thief; is it any wonder that the ornithologists hesitates to defend the bird whose character is painted as black as its plumage? Like the Blue Jay, whom ignorance and superstition has accused of "carrying sticks to the devil," he is looked upon as the representation of evil—a sort of visible demon; and if he is not just going into mischief he is popularly supposed to be just returning from it. Persecuted on every hand for many decades, in the East, it is a wonder that the species has not become exterminated. It has certainly decreased in Southern Pennsylvania, though almost imperceptibly, during the last fifteen years. Harmless, and even beneficial two-thirds of the year, prejudice against it begins to wane.

It is not my aim to justify the destruction wrought by these birds upon the cultivated fruit, grain and vegetables, or the eggs and young of wild and domestic birds, for I know it to be considerable at certain seasons of the year; but I fully believe the benefits derived from their destruction of injurious insects, rodents, etc., and their work as scavengers, largely offsets the damage done by them, if it does not indeed over-balance it. This ap-

plies to such districts as do not contain an over abundance of the birds.

To the bird's habitual watchfulness and acute senses, the situation of its nest and to its breeding in the busiest time of the year, can be attributed its abundance today. Driven from the field by the hundred and one devices of the husbandman, shot, trapped and poisoned they will continue to play the part Nature intended they should, and can only become extinct with the extermination of that which gives life to the country—the timber.

We are indebted to the pioneer ornithologists and to some of the present-day popular writers the latter making no display of scientific attainments for almost all we know of the habits of this and many other common species. A well prepared bibliography is beyond the scope of this present article, and the following original notes on the general habits, flights, food, etc., contributed from widely scattered localities, will unquestionably be acceptable to those interested from a scientific or economic standpoint.

Dr. William Bringhurst, Philadelphia, Pa.—"The American Crow remains with us throughout the Winter season, retiring on the accession of severe weather, to thickly wooded, hilly or mountainous regions. I live in a populous part of the city. At sunset Crows may be seen winging their way to their roosting places in New Jersey, returning in the morning and retiring to long distances inland, though some may remain nearer to us. The pine woods of New Jersey affords them a safe retreat. Reedy Island, at the head of Delaware Bay, being solitary and at a distance from the haunts of man, used to be a famous resort for

them, and likely is yet. They are astute birds, keeping well out of the way of man, seeming to know a gun from a stick. A pair built a nest in Logan Square and probably raised their young. As birds, animals, etc., are safe from molestation in these public parks, and can rear their young free from danger of attack by man, they soon acquire a degree of confidence."

John A. Bryant, Kansas City, Mo.— "To the public, the best known bird of all our species is the Crow. This species is noted for its thievishness, and its high degree of cunning seems to go beyond mere instinct. It feeds principally on carrion, fish and insects, and the young and eggs of both birds and reptiles. Last Spring I was a witness to this bird's great voraciousness. I was driving along a country road when I noticed a Crow fly down into a farm yard, close to a hen with a number of chickens about two weeks old; it singled out a straggler, and deliberately pecked it two or three times, entirely disabling it. The chick's cry of distress brought the angry parent to the rescue. The Crow was driven away a few paces; but a moment later, when the hen's attention was drawn away from the wounded chick, the Crow seized his struggling victim, and flying a short distance, devoured it.

"As another case of this species' greediness, as well as its acute sense of danger, I will relate the following experiment and its result. One day last May, while fishing, I noticed a Crow in the top of a dead tree, fifty yards or more away. It was constantly cawing and apparently watching me. Remembering the old darkey's adage, "A Crow knows a gun," I

thought it a good time to test the saying, so picking up my wooden fishing-rod case, I walked toward the tree where the bird was perched some sixty feet from the ground. Having reached the tree I walked around the trunk and back to the creek, where I had left my gun, without the bird taking wing. On reaching the creek, I substituted the gun for the rod case, and again started for the tree. I had scarcely taken a dozen steps ere the Crow decamped to another tree, nor could I approach within gun shot. I then placed my gun on the ground and attempted to get closer, but I found it as wary as before; the sight of the gun had destroyed all former confidence. On my return to the creek, my companion, who was further up the stream, called to me to bring my gun. I immediately complied with his request, leaving the fish I had caught submerged in the water on a string. I was absent probably an hour. On approaching, I observed a Crow sitting on a tree above where I had left the string of fish. Suspecting some mischief from its excited actions, I ran forward quickly to see what was up. The Crow cawed rapidly three or four times and flew swiftly away. Simultaneously from the waters edge arose two more Crows, acting on the signal given by the sentinel, in the tree. As they were eating the fish below the creek bank, they could not possibly have seen or heard my approach. I found nothing remaining excepting ten eyeless heads strung on the cord, the Crows having pulled the string from the water and eaten the fish on the ground.

"The great Crow roosts of the Middle States, famous in pioneer days,

seen to have diminished both in number of roosts and individual birds composing them. South west of this city there is quite a large roost, some members of which (400 or more by actual count) pass daily over the city to the Missouri river banks and sand bars, where they glean the refuse and debris washed ashore from the city. They congregate in November and disperse upon the breaking up of the Winter frosts. As the season advances, a half dozen or less may be seen in some pasture or marshy place, where the grass is short, feeding on all kinds of insects and their larva, crustacea, and in fact all animal life too weak to resist or avoid their rapacity. For several seasons past a flock has frequented a marshy pasture, close to the public road near to the river. Among them could plainly be seen a pure white specimen. So often was it seen, that it became a matter of publication in our daily papers. Many attempts were made to secure this "White Crow" but none were successful, as the wary cunning of the "Black Crow" was predominant."

Lynds Jones, Oberlin, Ohio.—"In Ohio the Crow is the terror of the corn field, and has been hunted until there is no getting near him. It is not strange if his nesting habits should conform to his general habit of watchfulness. Nests are often one hundred feet up in some such tree as sheldark hickory. I have never found a nest that could be reached without irons. In Iowa, the Crow is not an enemy to agriculture, and so is not hunted to any considerable extent, but he is nevertheless wary and not easily taken. Flocks are usually composed of less than ten individuals, but I have

seen hundreds of Crows gathered together seemingly for some special purpose. There is always a prodigious cawing and much changing of position among the individuals at such a time; but when the flock rises, it disperses in all directions and apparently never comes together again, unless at some other rendezvous. It may be simply a coincidence, but the flocks that have come my way have appeared about noon on an early Spring day. For so large a bird, its nest is remarkably near the ground. I have found many not over ten feet up in a thorn bush or scrubby oak."

Arthur H. Norton, Westbrook, Me.—"My observation on the nesting habits of the Crow have been made from Rockland to Portland, Maine, in several localities, but no where more than ten miles from the coast. Near Rockland, especially on the small islands of West Penobscot bay, and also the islands of a portion of Casco bay; the most constant features of the landscape are the dwarfed-spruce woods; but as we retire from the tide mark, on the mainland, we find a diversity of pine, oak, beech, etc., affording the bird a choice of nesting places. The nests that have come under my observation have invariably been placed in species of evergreen trees. The Crows have a habit which seems to be constant, when their nest is nearly completed, of calling in the low, imperfect voice of their young, as we hear them in July. By this means, I have located most of the nests that I have examined." [Another observer from the same state makes note of this. Can it be a peculiarity of the Maine bird alone?—F. L. B.] "While common throughout the belt, it does

not seem to breed abundantly in any portion of it. Each woodlet or wooded island may be the breeding station of from one to five pairs. Mentanic Island, in Penobscot bay, annually supports about five pairs. This number may be stimulated by the desire to pilfer the Night Herons (*Nycticorax nycticorax naevius*), which also breeds here in large numbers. On Crow Island in the same vicinity, the densely foliated white spruce (*Picea alba*) is the chief form of vegetation, and in these trees the birds formerly nested, building very low (about ten feet from the ground). The Island is uninhabited and seldom visited by man. In 1885, the Raven (*Corvus corax principalis*) took possession and no Crows nested there that season. There is constant warfare between the two species."

H. R. Buck, Wethersfield, Conn.— "Crows are very common with us at all seasons and especially so in Winter. Then they collect in large flocks, probably recruiting from much further north, and keep together pretty well until the breeding season. As a rule they spend the nights in the meadows of the Connecticut River, roosting in large numbers in the black oak trees, which are abundant in many places. At such times they are perhaps less watchful than in the day time, but nevertheless they always have guards posted, day and night. They can seldom be approached without the guards giving the alarm. Some twenty years ago my father shot sixteen by firing the contents of a double-barreled gun into a tree where they roosted. About dawn they begin to stir, and from sunrise until noon there is a steady stream of them flying to the neighboring hills,

where they pass the day. Here they feed on berries, seeds, and almost anything they can pick up. They undoubtedly do good by killing larvae and grubs, which they find under bark and leaves. Warm brooks are among their favorite feeding grounds, and they sometimes come quite close to farm yards in search of such scraps as may be thrown out. When the Spring thaws come, they may be seen almost constantly feeding on the edges of the melting ice, sometimes in company with the Herring Gull (*Larus argentatus smithsonianus*) which often comes up the river. Here they find acorns, berries, and the garbage from towns further up the river. They also collect in large numbers about the city dumps, showing a great fondness for carrion, and all refuse found in such a place.

"As the season advances, they abandon their routine habits, break up into smaller parties, and finally into pairs, when they set about the more serious business of nesting. In this locality they seem to like the sunshine, and avoid the deeper woods. When the eggs hatch, 'then the trouble begins' for the farmers, as the corn comes up about that time and the young birds must eat. I do not think the crows dig up the kernel before it sprouts, but from the time the blade first shows above the ground until it is three inches high, they seem to consider it their lawful property. They pull up the sprouts for the kernels at the end. The Crow does great damage in this way, especially in isolated fields, where the whole crop has sometimes to be replanted. There are two methods in use here for preventing this loss. The first and oldest way is to stretch white

cotton strings around and across the field about six feet above the ground. The Crow proverbially is a cunning bird, and when he sees the strings, he expects a trap and seldom goes into the fields. This way has been largely given up on account of its inconvenience and cost. The way now followed is that of coating the corn with tar. This gives a bitter taste to the kernel, so the Crows let it alone after pulling up one or two spears. The usual way of preparing the corn is to pour hot water over it and let it soak awhile; then for every bushel of corn, put in perhaps a half pint of 'North Carolina tar,' as it is labeled. This is better than the coal tar because it does not have to be melted. The water is then poured off and plaster, ashes, or sand is mixed to keep the kernels from sticking together. This hinders the growth probably a day or two, but it is a perfect protection from the Crows. Last Spring our tarred corn gave out and we finished the last rows of one piece with clean corn. After it had come up, we found that the Crows had pulled *every spear* of this corn, while the tarred corn at its side was hardly touched. The damage done to corn is not confined to the first few days. When it is in the milky state, they tear the husks and eat off the kernels at the tips of the ears. The harm done in this way is not great; the Purple Grackles, Red-winged Blackbirds and English Sparrows doing vastly more damage than the Crows. On the other hand, the Crows undoubtedly eat injurious insects, mice, moles, snakes, etc. April 15, 1893, I saw a Crow kill a grass-snake. It would have eaten the snake had not some boys frightened it away. During

Spring-plowing the Crows follow in the furrow to get the grubs that are turned up. Crows are much less abundant here today than ten years ago, and I am told that thirty years ago there were twenty where now there is one."

NIDIFICATION.

SITUATION.—The Crow usually chooses a tree situated as deep in the woods as possible, or in some quiet little grove of tall trees, where it can nest free from molestation and yet be near to its chosen feeding ground. The number and variety of eligible situations, the individuality of the bird, the *degree* of hostility prevailing in its neighborhood and the consequent measure of activity displayed by its enemies, having a large share in influencing the selection of a nesting site. Now and then a pair bubbling over with boldness or over confidence in man, will build in an isolated tree, usually but not invariably an evergreen, in the middle of a field or in an apple orchard. Mr. Frederick M. Dille collected a set of eggs from a tall cottonwood, in the midst of a dense grove, on Clear creek, directly on the outskirts of the city of Denver. He says: "I was greatly surprised at finding a pair of Crows breeding in such close proximity to a large city; but the birds were very quiet and retiring, as if they realized the delicacy of their situation." Mr. W. N. Clute, Binghamton, N. Y., cites two instances of this species nesting within the city limits. Dr. William Bringhurst, Philadelphia, Pa., takes note of a pair building in Logan Square, on one side of which stands the Academy of Natural Science, on another a grand Ca-

thedral, etc., every front being built around, and the square much frequented. At a later date, the same gentleman informs me that he has *heard* of a nest established among the trees of Independence Square right in the heart of the oldest portion of the city. It would surprise me little to learn that this was correct and that this saucy bird had raised its young within touch of the "Cradle of Liberty."

Mr. A. H. Norton, Westbrook, Maine, writes: "The first nests that I have found each season, have been built in trees at the border of an opening or grove, where the snow has disappeared. The point of the compass not, as might seem probable, having influence. The Southern exposure receives the sun's action, but the wind and water frequently are as rapid in melting the snow from northern or north-western exposures. The bird seems to like the sunshine (or society) and avoids the deeper woods." Mr. Henry W. Carriger, Sonoma, Cal., has found the nesting sites extremely variable, finding them in deep woods, groves, and along sloughs. He writes: "Previous to 1891, about ten pairs nested in a grove of young white oaks, but in 1892 not a nest was to be found there. The birds had gone, for some unknown cause, to a large grain field, about four hundred yards distant, where they built their nests in large white oaks." Mr. Edmund Heller, Riverside, Cal., states that the Crows in that vicinity nests only on the bottom lands, never in the canons nor on the mesa. Large tracts in that section are without their quota of birds. Mr. Samuel L. Bacon, Erie, Pa., writes: "My observations lead me to believe that if unmolested, a pair of

Crows will nest in the same vicinity for many years if not for a lifetime. To corroborate this belief, I will say that a pair of Crows (presumably the same pair) have nested for the past four years in one piece of woods, and these four nests are within two hundred feet of each other. In these woods, which covers about three acres, there are the remains of at least ten other nests, and I feel sure they were built by the same pair." Mr. C. W. Crandall has usually found them breeding in low woods, with parts swampy or containing a small pond, on Long Island N. Y. He also gives some notable situations: One nest fifty feet from a habitation, in a gigantic elm, at the roadside, another, one hundred feet from group of houses, another not more than thirty feet from a railroad in constant use; another, one hundred feet from a nest of Red-shouldered Hawk. Mr. Lionel F. Bowers, Columbia, Pa., and Mr. Arthur H. Norton, Westbrook, Me., have found their nests situated in the midst of Black-crowned Night Heron colonies. I have found them close to the nests of the Cooper's and Broad-winged Hawks, which they will rob if left uncovered for any length of time; and also in one instance within a few yards of a Grey Squirrel's nest.

POSITION.—The nest is usually placed in the upright fork or crotch of a tree, not seldom on a horizontal branch, at no great distance from the main stem. Mr. C. W. Crandall discovered a nest on Long Island, N. Y., in a most peculiar and unique position. In his own words: "Looking from the brow of a hill some thirty feet high, I discovered a nest situated in the fork of a chestnut tree, which was at the base of the hill, the nest being placed

forty-five feet up. The parent bird was sitting, and strange to say, was entirely visible from where I stood. Thinking this was very peculiar, I resolved to investigate. Upon climbing to the nest, I found that by some means, probably a heavy wind, it had become dislodged and had turned almost completely on its side, the eggs just being held in by the rim of the nest. The bird had to sit with one side against the *bottom* of the nest, with the other side exposed."

HEIGHT.—The distance from the ground, at which the nest is placed, varies from four to over one hundred feet. Where the birds are unmolested, they build remarkably near the ground, for so large and naturally suspicious bird. Where they are persecuted and continually hunted, the instinct of self-preservation, with which they are most certainly highly endowed, prompts them to build in practically inaccessible trees, in many cases. Such trees as sheltbark hickory, sycamore, large crooked black oaks, trees over-looking precipices or deep water, are often very difficult to climb, and the Crows often build their nests at a great height in those trees. Where the bird chooses an uninhabited island, an unfrequented swamp or the deep woods for breeding purposes, the nest is usually placed much nearer the ground than it would otherwise be. On the whole, mankind exercises more influence over this than is generally known. The average height throughout the country is about forty-five feet. Minnesota, North Dakota, Manitoba are but thinly settled, and the average height from the ground is found to be only twenty feet. The soil of the Eastern states is in a high state of

cultivation, and the New England farmer looks with an unkindly eye at the depredations of this black-feathered bird. His search for food is interpreted as a raid which must be resisted by force of arms; hence the bird becomes shyer and builds as high up as it is possible to do. The data before me gives an average of sixty feet above the ground.

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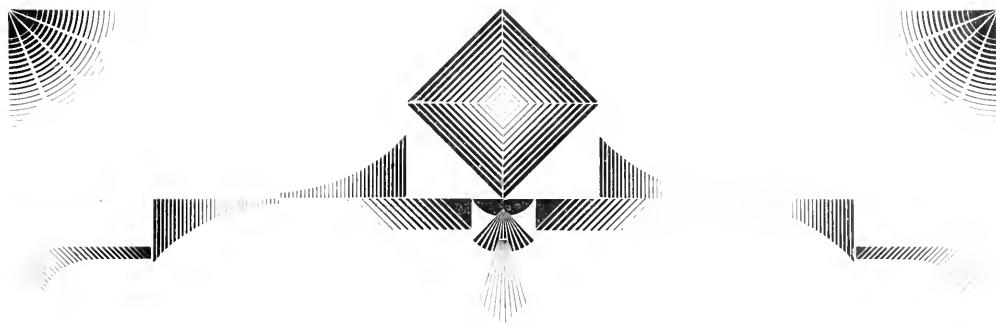
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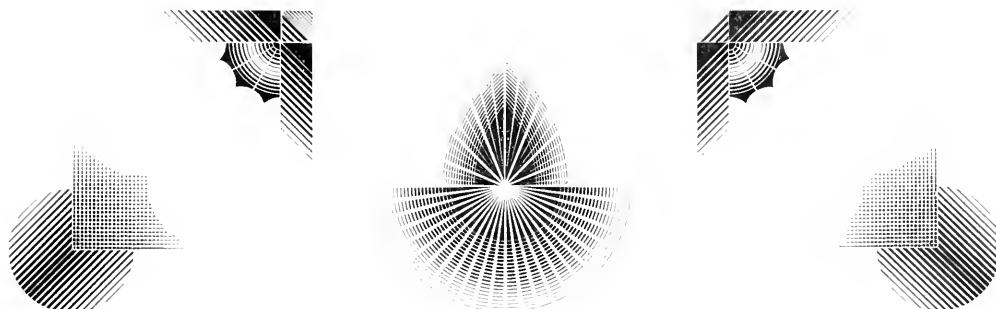
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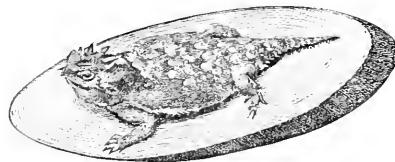
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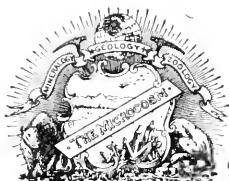
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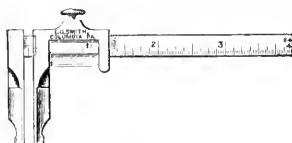
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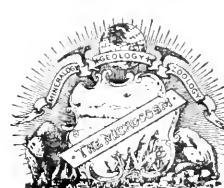
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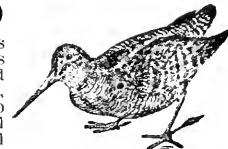
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VOL. I.

ALBION, N. Y., SEP. 15, 1895.

No. 11

The Great Auk.

(*Auka impennis*.)

The Great Auk, or Garefowl (*Auka impennis*), was the largest member of the Auk family, distinguished not only by its size, but by its flightlessness, enjoying the proud distinction of being the sole bird in the northern hemisphere incapable of flight. The name by which the Great Auk was originally and commonly known in America was Penguin, and the southern birds, now known by that title, did not receive this appellation until many years after. Garefowl is of Scandinavian origin, and comes to us by way of western Scotland.

In color the Great Auk most resembles its lesser relative, the Razorbill, the head, neck, and back being black, and the upper parts white. A peculiar mark of the bird was a great white spot in front of the eye, one old writer with a greater love of the marvelous than the truthfulness stating that this spot was found on the right side only. The wings, although far too small to sustain the bird in the air, formed an admirable pair of oars, the Great Auk being a most expert swimmer and diver, and performing even longer migrations than many of its relatives that were endowed with the power of flight. Many, possibly all, of the Auk family use their wings quite as much as their feet for propulsion under water, and they may literally be said to fly beneath the sea as well as over it. It has been noted that the inability of

the Great Auk to fly was due to lack of development of the bones of the forearm and hand, the humerous being proportionately as long as in other Auks. This modification of structure was directly correlated with the aquatic habits of the Garefowl, for the resistance of water being vastly greater than that of air, a wing especially adapted for subaqueous flight would demand less service and more power than a wing formed for aerial locomotion. In the case of the Great Auk this demand was made by shortening the greater portion of the wing, while other birds that use their wings in diving obtain as far as possible the same result by only partially opening their wings.

The Great Auk was confined to the North Atlantic, ranging on the European side from Iceland to the bay of Biscay, and on the American from Greenland to Virginia, these localities being the extreme limits of the bird's migrations.

Greenland was the habitat of the Garefowl to a very great extent, and the same may be said of the coast of Norway, while the southern limits given above were reached only during the winter migrations of the bird. The positively known breeding-places were few in number, those where the bird bred abundantly, being the Garefowl Skerries off the coast of Iceland and Funk Island on the Newfoundland coast. These islands, or more properly islets, were very similar in their gen-

eral character, being isolated rocks, lying at some distance off shore and difficult of access. Of course this reason for similarity is apparent.

The Great Auk and its eggs formed desirable articles of food, and since the bird was helpless on land, it was easily captured, whence it came to pass at an early date that the bird was exterminated at all localities easy of access. Another and more important factor in the extermination of the Auk, especially in America, is to be found in the gregarious habits of the bird and its predilection for certain breeding places. This habit of the Garefowl is shown by other birds which are restricted in their breeding habitat, without any apparent reason, although there may be some unknown cause in the nature of food-supply that might account for it. A good example of this is found in the Gannet, which, although a bird of powerful flight, breeds at only three localities on the eastern coast of America, and in Europe crosses the North Sea to nest in Scotland, when localities seemingly quite as favorable exist along the shores of Norway. There were apparently plenty of suitable breeding grounds for the Great Auk in Maine and Labrador, but had the bird bred in small colonies at localities scattered along this wide expanse of territory, it would have been in existence today.

The most important breeding-place of the Garefowl was an islet 25 miles off Reykjanes, Iceland, where, for many years, it led a somewhat precarious existence, several times seeming to have been so reduced in numbers that expeditions in search of birds and eggs were not worth the risk. Still the bird would have existed in this lo-

cality many years longer than it did, but for volcanic disturbances in March, 1830, during which the Gierfulasker sank beneath the level of the sea compelling the existing Garefowl to seek new breeding-places. Most of them appear to have moved to an islet by the name of Eldey, and this being near the coast and more accessible, the few remaining Great Auks were in the course of fourteen years all killed, the last pair being taken about the 3d of June, 1844, this being the last authentic record of the Great Auk in Europe. It was from this locality that most of the skins now extant were obtained, only one mounted specimen being recorded from American localities, although nearly all skeletons have come from Newfoundland. The history of the Great Auk in America may be said to date from 1534, when on May 21, two boat's crews from Cartier's vessels landed on Funk island, and, as we are told, "In lesse than halfe an hour we filled two boats full of them, as if they had been stones. So that besides them which we did eat fresh, every ship did powder and salt five or sixe barrels of them." The Great Auk having thus been apprised of the advent of civilization in the regular manner, continued to be utilized by all subsequent visitors. The French fishermen depended very largely on the Great Auks to supply them with provisions; passing ships touched at Funk Island for supplies; the early colonists barrelled them up for winter use, and the great abundance of the birds was set forth among other inducements to encourage emmigration to Newfoundland. The immense numbers of the Auks may be inferred from the fact that they withstood these

drains for more than two centuries, although laying but a single egg, and consequently increasing but slowly under the most favorable circumstances. Finally some one conceived the idea of killing the Garefowl for their feathers, and this sealed its fate. When and where the scheme originated, and how long the slaughter lasted, we know not, for the matter is rather one of general report than of recorded fact, although in this instance circumstantial evidence bears witness to the truth of Cartwright's statement that it was customary for several crews of men to pass the summer on Funk Island solely to slay the Great Auks for their feathers. That the birds were slain by millions; that their bodies were left to moulder where they were killed; that stone pens were erected; and that for some purpose frequent and long continued fires were built on Funk Island is indisputable. This locality has been but thrice visited by naturalists, the last time in the summer of 1887, by a party from the U. S. National Museum, who, by the aid of the U. S. Fish Commission, were enabled to obtain much information in regard to this interesting spot, and to make very extensive collections of the remains of the Great Auk. Just when the Great Auk ceased to exist in America is unknown, for there were few naturalists on this side of the water when the Garefowl was being done to the death; but the distinction took place not far from 1840, almost coincidentally with the extermination of the bird in Europe. Few birds have received more attention than has the Great Auk since it became extinct, and it has been the subject of numerous papers, both popular and scientific, while its

remains bring extravagant prices whenever chance brings them into the market. The last skeleton sold brought \$600, the last skin \$650, while an egg brought \$1,250, and then was resold for the round sum of \$1,500.—*Proc. N. S. Nat. Museum.*

Notes on Hibernating Mammals.

A very prevalent impression exists that hibernation among mammals is so fixed a habit that it may be defined in a few words, that it occurs with all the regularity of sleep, and is as necessary to the creature's welfare as food and drink. So far as these hard and fast lines are drawn, so far is our understanding of the subject warped and imperfect.

In the ninth edition of the "Encyclopedias Britanica" hibernation is defined as that "peculiar state of torpor in which many animals which inhabit cold and temperate climates pass the winter." Here we have the characteristic feature of the habit clearly expressed; but when we come to consider the minor details we do not find that any two animals, however closely allied, hibernate in precisely the same manner, nor do individuals of the same species always hibernate alike. Further, we do not find that it is so common an occurrence as usually supposed; and no animal appears to hibernate merely because winter has "set in," regardless of the temperature then prevailing. My own studies of animal life in this neighborhood (Central New Jersey) lead me to conclude, rather, that it is a happy faculty which certain animals possess, but do not willingly exercise. If the prevailing temperature forces them, in self-defence; to hibernate, they can; but so

long as they are able to withstand a low temperature, and food is accessible, they resist. Other causes than cold may induce an animal to hibernate, as when deprived of the supply of food gathered during the preceding autumn. In such a case squirrels will pass the winter in a state of torpor, however mild the weather; while, with an abundant food-supply, they will simply sleep through the colder days and awake to feast whenever the sun shines brightly.

Of the 30 or more animals found here thirteen species are supposed to be hibernating animals. These are four species of bats, two of moles, three squirrels, one ground squirrel, one marmot, one jumping-mouse and one *Hesperomys*. Of these probably the bats are most sensitive to cold and avoid exposure to it with the greatest care; and yet I find that the little red bat (*Atalapha novaeboracensis*) is very late in retiring for the season and appears with great regularity early in February. Their actions at this time indicate that considerable food is to be had—flying insects are abundant. While this bat's ordinary habits do not differ from those of the other species, it is apparently less sensitive to low temperature and needs but the least encouragement to arouse from its hibernating sleep. It is also less crepuscular in habit than the others; but I do not know that this fact has any bearing upon the irregularity of its hibernation.

Bats disappear in November or December, immediately after the formation of ice, but do not seem affected by a mere succession of hard frosts. As insect life is not materially affected by the first few frosts, there does not

seem any reason for their withdrawal from active life and therefore it is not surprising that even up to Christmas bats should be seen flying at sunset in considerable numbers. When the steady cold of an average winter fairly reaches us bats hibernate in two ways. If they resort to the ordinary shelter of a hollow tree or similar locality that is considerably exposed to the wind then many individuals cluster together; and contact is mutually beneficial, for the torpor of hibernation is not rapidly but rather gradually acquired. Such clusters of bats, if disturbed immediately after gathering together, are as resentful as when captured during mid-summer; and not until three or four days have elapsed do they become insensible to disturbance. If this be very violent and the creatures roused suddenly a curious condition of aimless activity ensues but lasts for a short time only and often ends in death.

On the other hand I have very frequently found solitary bats in curiously out-of-the-way places, where they were so protected that they could not have suffered from the severity of the season, however intense. In such cases the torpor was never profound, the temperature of the body but little reduced and the heart's action almost normal. For instance: a single dusky bat (*Vespertilio fuscus*) slept, or hibernated, as described, for thirteen weeks, in the attic of my house. It clung to a nail driven in the wall of the chimney, and was protected by a piece of woolen cloth hanging from a beam above it. The chimney retained a little of the warmth derived from the smoke-flues which passed through it and which were in constant use dur-

ing the time. This bat could be taken down and hung up as readily as an inanimate object, yet clearly showed that it was conscious of the disturbance to which it was subjected. Once I brought it into a warm room when it revived in thirty minutes and flew about the apartment, but not with a very steady, well-directed flight. When taken again to the attic it responded to the effects of the lower temperature by resuming its former position, after a steady to-and-fro flight from end to end of the attic for nearly an hour. The bat seemed to be wholly aware of the position of the nail in the chimney, and when wearied of its flight turned to it directly and folding its wings about it seized the nail with a tighter grip and hung head down as it had been doing. In two hours I went to it again and found it as indifferent to handling as before.

The two species of moles so common with us hibernate in quite different ways, the habit varying as much with them as does the character of their respective habitats.

The common mole (*Scalops aquaticus*)—which, by the way, is in no sense aquatic—burrows deeply in the dry soils, keeping just beyond the frost-line; and there it remains, without a nest of any kind, until the warmth of the spring sunshine melts the frosts, loosens the soil, and sets the subterranean prisoner free. If, as sometimes happens, the cold is unusually intense and sudden, the ground freezes below the resting-places of the hibernating moles, and then they are frozen to death. This, I judge, does not often occur; but the approaching frost rouses them sufficiently to place them

on their guard, and forthwith they burrow a little deeper.

It is very different with the meadow-haunting, star-nosed mole (*Condylura cristata*). This mammal has more complicated burrows than those of the preceding, and often one or more openings to them are beneath the surface of the water. At some point in their tangled tunnellings, these moles form commodious nests, placing a good deal of fine grass in them. Here, indifferent to freshets, they remain all winter, and as they can lay up no food, sleep, I suppose, through the entire season.

The fact that these moles are unaffected by being submerged during the spring freshets is an interesting fact. So far as I have examined their nests, there was nothing to show that they were water-tight; and I think that the animals must have been thoroughly soaked for from forty-eight to seventy-two hours, the ordinary duration of the high water. If through any cause the period of submergence was prolonged, it is probable that it would prove fatal to the moles.

The short-tailed schrews (*Blarina brevicauda*), on the other hand, which are closely akin to the foregoing; are full of life and activity all winter. No severity of the weather chills their ardor, but this is not to be wondered at. Their favorite food is grass-hoppers, and these are to be had in abundance the season through. Every warm day brings hundreds of half-grown, wingless grass-hoppers to the surface, where they move about very actively. A few years ago, on Feb. 3, I found literally millions of them hopping over the dead grass, in the meadows, as

restlessly as though it were August. The ground was frozen, and the sunlight had merely warmed and dried the tangled mat of dead grass upon the surface. At various points I found the openings of tunnels, which I took to be the path-ways of the crepuscular schrews, shy little creatures, that towards sunset come to the surface and forage during the twilight.

Omitting reference to the winter habits of the familiar squirrels and woodchuck, or marmot, let us consider briefly the two small rodents found here that are also hibernating animals, the jumping-mouse (*Zapus hudsonius*) and the white-footed mouse (*Hesperomys leucopus*). These two mice, popularly so called, hibernate with great regularity in one sense but differ *inter se* in another. The former, once torpid remains so until spring, a few warm days in winter failing to rouse them; but the white-footed mouse seems simply to sleep soundly rather than grow torpid, and responds with considerable promptness to any disturbance. The jumping-mouse builds a nest of leaves and grass at a considerable depth from the surface of the ground (not a "ball of mud," as stated in the "Encyclopedia Britannica," art. "Jerboa"), and once fairly settled therein, is beyond the various sudden changes of our winters; the white-footed mouse, on the contrary, utilizes an old bird's nest or has a resting-place beneath a log or in a half-decayed stump. In such positions, of course, the occupant is more likely to be disturbed and is also directly exposed to the varying temperature. Is it to meet the requirements of this condition that this mouse lays up a goodly stock of food during autumn?—

something the jerboa or jumping-mouse, does not do. However this may be, the fact remains that both these rodents are quite sensitive to cold, and hibernate as soon as winter sets in; yet how very differently is this faculty exercised.

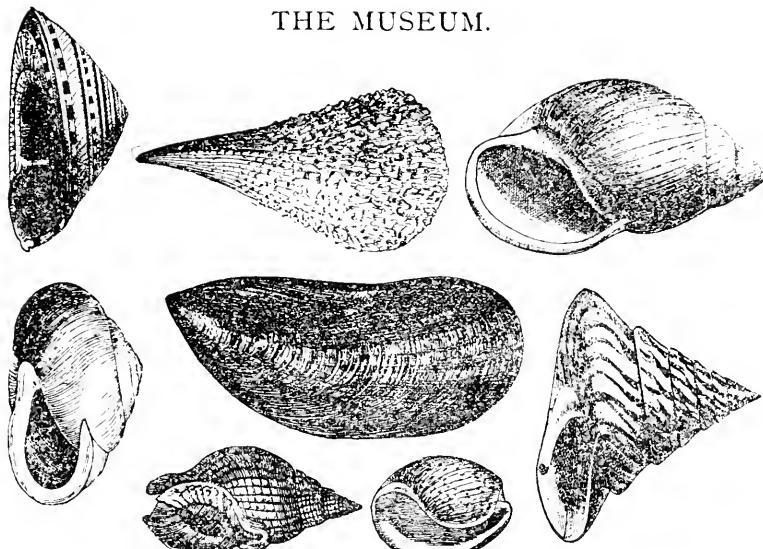
C. C. ABBOTT.

The Common Polypody.

(*Polypodium vulgare*.)

The common polopody is one of the ferns which it seems must be known to everybody, by sight at least. It is one of our most abundant species and wherever there is a ledge of rocks is almost sure to be found. Few ferns love the rocky walls more than this one; other ferns may grow at the base of the cliff but the polopody is content with nothing short of the summit or higher ledges where its matted fronds and root-stocks form the principal vegetation. So constant is this feature of the fern that one may almost identify it with certainty as far as he can see it.

The situations in which the polopody grows are often exposed to considerable drouth but the plant is one of the few ferns that can exist in sunny places and is able to get along with very little moisture. When the ground about it becomes dry and other ferns are drying it mereles curls up its fronds and waits for the rain. In the Northern United States this fern is found on rocks, only, but in other localities where there is more moisture in the air it leaves the rocks and grows on stone walls, the trunks of trees and even on the roofs of houses. It is usually found in such places in the



Solarium perspectivum, stair case shell. *Pinna muricata*, Fan Shell.
Helix Zebuensis, Oregon Helix. *Mytilis smaragdinus*, Mussel Shell.
Nassa bicolor. *Bulla ampulla*.

Bulimus oblongus, So. America.
Trochus niloticus, Pearl Trochus.
Natural Color.

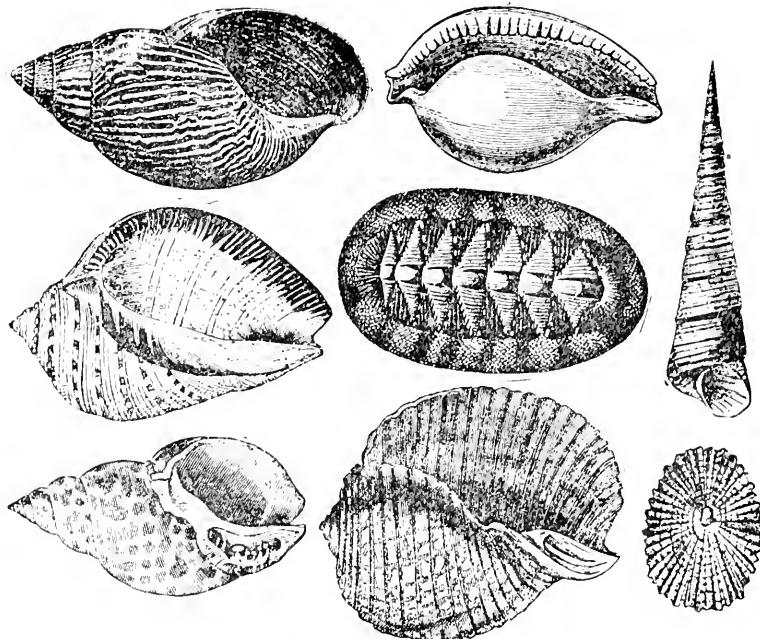
South and gradually takes to the rocks as one goes Northward.

This is one of the most widely distributed of ferns, being found in our own country from Greenland to Mexico and the West Indies and also occurs in Europe, Algiers, Maderia, the Canary Islands, Japan, China and Northern Asia.

In winter the majority of ferns in the Northern States die down to the ground, but the polypody is an evergreen—one of the few plants that "keep the woods warm in winter" by the semblance of summer. Climb the nearest fern-clad height in any weather and you are quite likely to meet with this fern. The fronds do not rise in circular tufts as do those of many other species but the chaffy root-stock twists about here and there sending up fronds at random. These are joined to the root-stock by a distinct articulation. They are somewhat leathery in texture and simply pinnate making a most handsome form which is often used in winter decorations.

In July the fruit-dots appear on the back of the fronds. They are round and bright yellow in color at length turning brown. Under the microscope they appear like collections of tiny globes, each attached to the frond by a slender stalk. These globes contain multitudes of minute bodies called spores. When they are ripe the globes burst open and the spores drift away on the wind to form new plants. Unlike other orders of ferns the polypodies do not have the fruit-dots covered, when young by a special membrane called the indusium.

The name polypody is derived from two Greek words meaning "many feet" but whether in allusion to the many divisions of the frond, the branching root-stock or the numerous roots is not quite clear. The ancients attributed many and various medicinal qualities to the plant. It was supposed to be a specific for jaundice, dropsey, tape-worm and coughs. The polypody which grew on the oak was famous for the cure of madness and



Achatina varigata, Agate shell.

Purpura Persica, whelk.

Eburna Japonica, Japanese Eburna.

Ovulum ovum, Egg Shell.

Chiton squamosus, Scalyribbed Chiton.

Dolim galea, Cask Shell.

Turritella crocea, screw shell.

Fissurella, Keyhole Limpet.

for driving away melancholy. The old poet Drayton alludes to this belief in the lines:

"Here finds he on the oak
Rheum purging polypodie."

The roots were gathered in autumn, reduced to powder and used for coating pills, or they were burnt and their ashes used as a substitute for soap. An oil was also distilled from them with lime. The sickle-leaved polypody of the West is used by the natives in preparing tobacco for the sweet flavor imparted. Among magical properties the polypody was supposed to have the power to confer wealth and to render persons invisible.

The polypody is often cultivated and thrives well whether in the fern-garden or the in-door fernery. In rocky places no fern does better. Owing to its manner of growth it is very easily multiplied since by pulling

the root-stock to pieces each section will soon grow into a separate plant.

W. N. CLUTE,
Binghamton, N. Y.

Our Friend the Skunk.

BY W. H. KITCHELL.

There is no quadreped on the continent of North America that is more generally detested and shunned than the common skunk, notwithstanding the fact that no other species is half so valuable to the farmer. Its nocturnal habits, together with the exaggerated accounts of its well-known power of defense, written by popular writers on natural history, have done much toward the preservation of one of the most valuable fur producing animals that still exist in the United States.

Having had some little experience with the genus *Mephitis*, it is the purpose of this article, not to add to

the pile of calumny already heaped upon this much abused animal, but to say a few words in its defense.

The Mephitinæ is a small group possessing three genera in the ascending order, *Spilogale*, *Mephitis* and *Concupatus*. In general the ground color of all is black or blackish; and in all the genera, though sometimes nearly obsolete, is a narrow white stripe, reaching to the nape and there widening into an area more or less pronounced.

The skunk being a hibernating animal, retires to his burrow about December 1st in the Northern States, and remains underground until about the middle of February. He lays up no winter store, and like the bear and raccoon is very fat on retiring to his winter quarters, and does not seem reduced in flesh at his first appearance toward spring. He is not a sound sleeper during his period of retirement, and it needs some care to keep out of his way, if an attempt is made to surprise him. The burrows of the skunk are far less difficult to dig out than those of the fox. They are generally found on a flat surface, while the den of a fox is generally made on the slope of a hill. They have seldom more than one entrance, while those of a fox have from two to three. The burrows are about two feet below the surface of the ground, and extend seven or eight feet in a nearly horizontal direction, terminating in an excavation containing an immense nest of leaves. Here during winter may be found from five to fifteen individuals of this species, ready to use if necessary, the only means of defense with which Nature has provided them.

The most striking characteristic in

habit, of the Mephitinæ is that one which gives the family its maladorous reputation, and in describing that characteristic we will select for our purpose the typical one in this group — *Mephitis mephitis*, the common American skunk.

In the human species we sometimes find that a particular faculty has received an extraordinary development, the result of constant attention to one subject, and it is the same when applied to any particular organ or member of the body, which by constant use (like the organs of touch in the blind) become so important as to serve as a substitute for others. In the lower animals this prominence is the result of its peculiar formation, or of instinct. Thus the power of the kangaroo is concentrated in its enormous hind feet, which not only enable him to make the extraordinary leaps by which he can escape from his pursuers, but which form a terrible means of defense; the rattlesnake's deadly power is conveyed through its fangs, and the bee has the means of a lively defense in its sting, while in every other power of attack or defense these various creatures are comparatively feeble.

The skunk, although armed with claws and teeth sharp enough to capture and tear his prey, is slow on foot (except when pursued), apparently timid, and would be utterly at the mercy of his numerous enemies were it not for the peculiar power which Nature has given him, enabling him to defy his four-footed enemies, and often causing even the bravest of our boasting race to beat a hasty retreat.

I have never felt that aversion to the musky odor imparted by the skunk that others evince, although I

admit that a close proximity to a recently killed skunk is rather overpowering to a weak stomach, but I think the description of its penetrating influence given by most naturalists is, to say the least, greatly exaggerated.

That the bite of the skunk will cause hydrophobia, as many writers assert, is, without doubt, a relic of Indian superstition. No direct evidence has ever been given from a reliable source, to prove that any person or animal ever suffered that terrible affliction from the consequences of a skunk bite, and a great deal of evidence could easily be found to prove that it does not. I know from personal experience of a dog who was bitten on the nose while shaking a skunk, and who has never suffered from hydrophobia either before or after being bitten.

Here is an anecdote from Wood's Natural History, Volume 2, page 376:

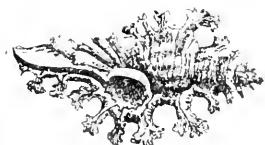
"A dog whose coat had suffered from the discharge of a skunk, retained the stench for so long a time that even after a week had elapsed it rendered a table useless by rubbing itself against one of the legs, although its fur had been repeatedly washed. If a single drop of the odorous fluid should fall upon the eyes it would deprive them of sight." The first statement is absurd, and unjust to the skunk, and is greatly exaggerated in every detail. If it rendered a table useless after seven days' time, what a week of suffering that dog must have had. That the fluid could cause blindness is quoted by most naturalists, and until last autumn I believed it to be the case myself. I accompanied a skunk hunter on several of his nightly expeditions, and on the first night, if I remember rightly, my companion re-

ceived a full dose of the liquid square in the eyes. It blinded him for a few moments, but not so much as to deter him from killing a skunk and carrying it home. It of course pained him very much for a short time, but after washing the eyes with warm water, and a good night's rest, his eyes were as well as ever. The effect was apparently no more than any strong liquid would cause if thrown into the eyes.

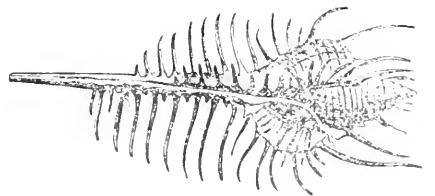
I remember reading in an old natural history that the skunk first discharges the liquid on its tail, and then flirts it at the enemy in a mop-like fashion. The skunk is a remarkably clean animal and never discharges the fluid except in self-defense, and as careful to avoid soiling himself with the fluid as the rattlesnake is not to suffer his body to come into contact with his poisonous venom. The tail of a skunk is the handsomest part of a very beautiful animal, being very long and bushy, with coarse, glossy hairs. The action of discharging the fluid is identical with that of a syringe with compressible bulb, the raising of the tail compressing the sacs containing the secretion, throwing the fluid to a distance of from ten to twenty feet in a fine, mist like stream.

When discharged at night the liquid has a yellowish phosphorescent appearance, the odor being perceptible for a mile or more off. It is more offensive at night and in damp weather than during the day or in a draught.

Although by nature the skunk is a slow and clumsy pedestrian, yet when hard pressed by pursuing enemies it will move fast enough to keep its pursuers on a swift run for some distance. It cannot swim or climb trees, except



Murex palma-rosæ.
Vermetus lumbriicalis, Worm Shell.



Murex tenuispina, Spiney Murex.
Fusus pacifica, Fusus.

with great effort, and therefore does not destroy large quantities of birds' eggs as some naturalists would have us believe.

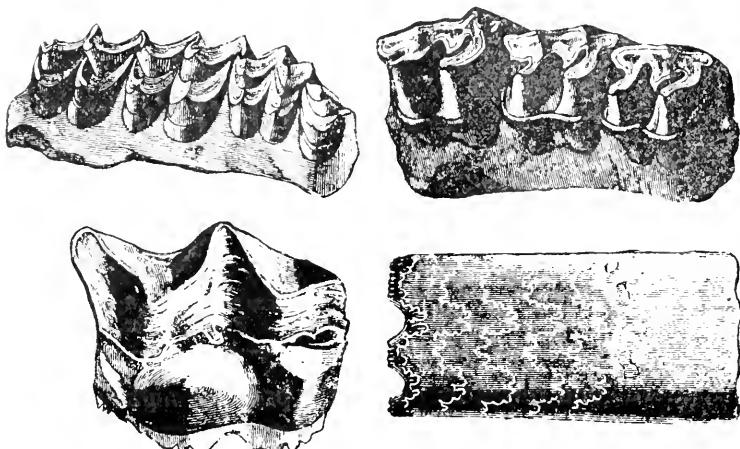
The skunk does not support a good character among the farmers. He will sometimes find his way into the poultry house and make some havoc with the setting hens; he is especially fond of eggs, and is not very particular whether they are fresh or contain pretty large rudiments of the spring chicken, yet he is so slow and clumsy in his movements, and creates such a disturbance in the poultry house, that he is easily detected, and the farmer can blame himself if he does not stop the career of his nocturnal visitor. The poultry have far more formidable enemies than the skunk; the weasel, fox, mink and hawk are rivals with which his awkward powers cannot compete. Pre-eminently an insect eater, the skunk destroys more grasshoppers, coleoptera and other insects injurious to vegetation than all other mammals combined, and in addition he destroys large quantities of mice and frogs. On dissecting a specimen he obtained from South Carolina, Audubon discovered that the skunk had been a more successful entomologist than himself, for he had devoured on

the previous night a greater number of a rare and beautiful beetle *Scarabaeus tityrus* than the great naturalist had been able to find in a search of ten years.

Sir John Richardson once said: "One may soon become familiar with the odor, for notwithstanding the disgust it produces at first, I have managed to skin a couple of recent specimens by recurring to the task at intervals." The knowledge of a proper method of killing the skunk would have rendered such a statement unnecessary. If caught in a deadfall, or killed with a club or shotgun before it has time to discharge the fluid, the task of skinning a skunk is no harder than that of skinning a raccoon or opossum.

The fur of the skunk is a valuable article of commerce when dressed, being known as Alaska sable; although, being coarser, it is less sought after than that of the beaver and sable. It is valueless in summer, and is at its best in October and November. The value is regulated by the color, condition and quality of the fur, and by the supply and demand. A jet black pelt is worth more than one containing more or less white.

The flesh is said to be sweet and well flavored. The meat is white and fat, and is pronounced to be much su-



Fossil Teeth and Baculite from South Dakota.

perior to the raccoon and opossum, and equal to roast pig.

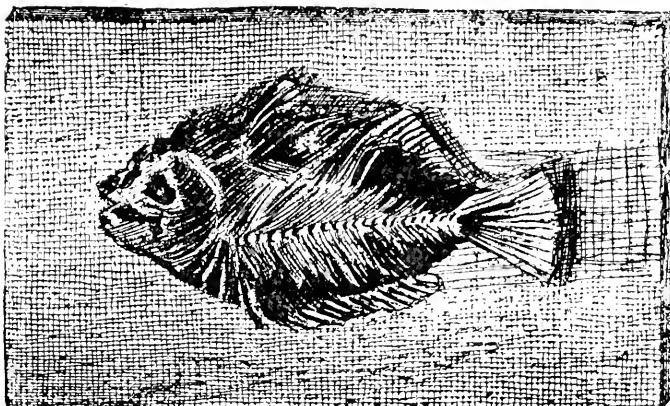
There is nothing in Nature that is wholly evil, and even the peculiar offensive liquor contained in the sacs of the skunk has been proved to be possessed of medicinal virtues, being sometimes used for the purpose of giving relief to asthmatic patients. Audubon tells the story of a clergyman who had been accustomed to use the scent glands of a skunk for this purpose, and to keep them in a closely stoppered bottle. It happened one Sunday that having been attacked by a fit of asthma, he took his bottle into the pulpit, and when his breathing became difficult he opened his bottle and applied it to his nostrils. Whether he obtained the desired relief is not stated, but he was spared the trouble of continuing his sermon, as the congregation beat a hasty retreat, and left him nearly alone in the church.—*Popular Science*.

A Bird Hospital.

Among its many admirable institu-

tions for the care of the sick and disabled, says the *Times-Herald*, Chicago enjoys the distinction of possessing a bird hospital, the only one of its kind, it is claimed, in the United States. This unique establishment has never been beneficiary of an endowment either by the State or at the hands of individuals, yet its manager, C. A. Cross, seems to be able to make the financial ends of the institution at least meet, if they do not overlap to any great extent.

It is only necessary to watch Mr. Cross for a few moments moving about among his feathered friends to realize that his heart is in his business. While his work brings a living to himself and wife, it also brings restored health to many a little winged sufferer, and this phase of his life work apparently affords the bird doctor quite as much satisfaction as the other. His wife, however, seems equally interested and absorbed in the novel business, and he modestly attributes much of the success of the "institution" to her delicate care of the indisposed inmates. The



Fossil Fish from Green River, Wyoming.

birds, too, seem to understand all this, and evince their appreciation by signs, and sometimes utterances, which show how deeply they appreciate the kind offices of their physicians.

According to Mr. Cross, birds are subject to nearly all the ailments which infect humanity. The parrot particularly, which may be considered the autocrat of the feathered tribes leads all birddom in the number and variety of diseases to which it is subject. Pneumonia, catarrh, consumption, diphtheria, tonsillitis, and a wide range of other throat troubles are among the common ailments of this popular pet. Even gout among the more highly favored in the matter of ownership is not uncommon among these the upper ten of birddom.

Mr. Cross explains that the most fruitful sources of disease among parrots are improper food and carelessness on the part of their owners in leaving doors and windows open while the birds are moulting, so that they then contract colds. Improper food results in stomach troubles, frequently

catarrh of the stomach. This is brought on most frequently by feeding the birds potatoes and other greasy food. In the case of Charley, the Colorado parrot, his distemper was brought on by eating meat and greasy food from his owner's table. The moulting season is the dangerous time for all captive birds, and as this is the parrot's season for shedding his feathers, sick birds of that species now predominate at the hospital.

Mocking-birds and canaries moult later, in the early fall, and Mr. Cross says he always has his hands pretty full with these little singers during that season. Though he does not get as much for taking care of the smaller birds, they are really more trouble, as they are not so easily handled as the parrots and have less intelligence to aid in pulling them around.

[During my short residence in Chicago in '93-4 I became well acquainted with Mr. Cross (his store being but a block from mine) and must say he has a very complete knowledge of the diseases of birds.—ED.

THE MUSEUM.

A Monthly Magazine devoted to Ornithology, Oology, Mollusca, Echinodermata, Mineralogy and Allied Sciences.

Walter F. Webb, Editor and Pub'r,
Albion, N. Y.

Correspondence and items of interest on above topics, as well as notes on the various Museums of the World—views from same, discoveries relative to the handling and keeping of Natural History material, descriptive habits of various species, are solicited from all.

Make articles as brief as possible and as free from technical terms as the subjects will allow. All letters will be promptly answered.

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WALTER F. WEBB,
ALBION, ORLEANS CO., N. Y.

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NOTES.

We regret to be obliged to warn collectors against having anything whatever to do with one F. H. Carpenter, whose home was formerly in East Providence, R. I., for several months past at Plymouth, Mass., and who is liable to pop up most anywhere in the future.

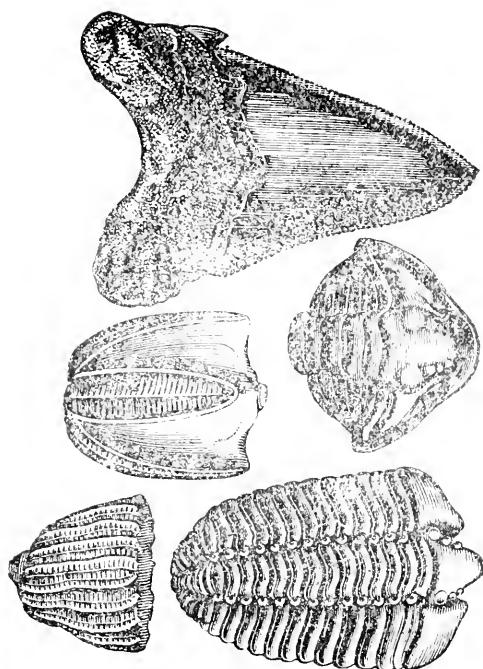
We have no hesitancy in pronouncing him an all around rascal. He is smart, writes a good letter and is of good address. Rascals nearly always are, who evade the law as long as he evidently has. Although he has been arrested several times, he has succeeded through his honorable parents and relatives, in getting out. For three or four years he has been laying low, so to speak, not having brought himself

forward as he did some eight or ten years ago, but we have abundance of evidence to prove, that he has been quietly defrauding scores of collectors, and has thereby made a neat little sum outside of the work he has found to do. We write what we are prepared to prove, having already spent nearly \$100 in looking up his pedigree and intend to follow the matter up until he is put in the proper place for characters of his repute. Any collectors that have been defrauded by him within one year past, or know of any one who has, write us with particulars.

We may be obliged to report another case, somewhat different from that of Carpenter, which has repeatedly within the last few months come to our notice. We have written him twice and failed to get any response, although have positive proof that the letters were received by him. Possibly this notice will bring him to a realization of the fact that the using of the mails for such purposes as he has been carrying on, is a serious offense.

It is not our design or purpose to make this a regular feature of the MUSEUM, but we said at the outset that we should endeavor to keep all parties of doubtful repute from using the columns of the MUSEUM, and as the two parties we have in mind have used our columns, with an evident intention to defraud, we feel it our duty to inform our subscribers as to their true character.

It is a gratifying sensation to be aware that your subscription to the MUSEUM is paid up for a year ahead and you can rest assured of receiving it regularly. Sent your dollar yet?



Fossil Shark Tooth, Pentremite, Ind., Trilobite, Calamene senaria, Ohio, Trilobite, Calamene, Niagarensis, Ohio and New York, Crinoid head, Indiana.

Breeding Habits of Toads.

It was stated that a correspondent of Meehan's Monthly inquired how it was possible to find toads no larger than peas if the tadpole is the first stage of toad life. The reply of the Monthly was to the effect that toads are oviparous or viviparous according as water is or is not accessible. This is not quite true.

Every toad passes through the tadpole stage, however far he may be from the water, and no case is known of a toad bearing young alive, but all toads and frogs lay eggs. It is true that some forms pass through the tadpole stage while still in the egg, and others carry their young in various ways until the tadpole period is passed,

but none of them ever bear young alive, as viviparous in its true sense would imply.

It may be interesting to note some of the curious breeding habits of toads. The remarkable toad of South America, *Pipa americana*, is the most extraordinary. The eggs are laid by the female, and are immediately transferred by the male to the back of the female, to which they adhere and where they are impregnated. The skin of the back is excited into increased activity by the presence of the eggs, and gradually grows up around each egg, until it is enclosed in a pouch.

Here the eggs develop, passing through the tadpole stage, and when the form of the adult is reached the little fellows emerge and take up an independent existence. Pouches filled with eggs, to the number of one hundred and fourteen, have been observed on the back of a single female. This is the only case among the Batrachia in which the young are nourished at the expense of the parent, but even this toad could not be called viviparous.

Another interesting form is the obstetrical toad of middle Europe. The eggs are laid by the female in a long albuminous string which is taken by the male and wound about his body and thighs. The albumen dries and the eggs become fastened to his body and there remain until hatched.

The species *Nototrema* and *Opisthodelphys* of Peru carry their eggs in a pocket formed by the unfolding of the skin of the back; the young of the former leave the egg while tadpoles, those of the latter pass through their

entire metamorphoses while in the pouch.

Our own toads deposit their eggs in long albuminous strings having the appearance of a necklace of black beads. The eggs of the frogs and salamanders are deposited in more or less globular masses of the albuminous substance. We may distinguish the eggs of the salamanders from those of the frogs, for the former have a circular outer envelope which surrounds each egg.

The tadpoles of the toad, unlike those of the frog and salamander, retain their early black color throughout their larval state. They also undergo their metamorphoses while much smaller than the frog. The toad tadpoles take on the adult form when they are literally not larger than peas. At this stage they leave the water in great numbers and make long journeys in every direction, traveling mostly at night, but often emerging from their hiding-places after a rain, thus giving rise to the suspicion that they have fallen with the rain.

The hylidæ or tree-toads lay their eggs in the water, in small pockets, and not in strings as do the other toads. They also undergo their metamorphoses while small. One of the Mexican tree-toads is said to deposit its eggs in the water which accumulates in the axils of leaves and to undergo its changes high above the ground.

In the spring of the year nearly every pond and pool will be found on careful search to contain numerous masses of albuminous jelly filled with eggs in various stages of development. Nothing is more interesting than to bring home these eggs and watch them develop from day to day. Whether

they be the eggs of frogs or salamanders, or the strings of toad's eggs, we shall see them all hatch into lively little tadpoles. We can scarcely hope to keep the frog or salamander tadpoles until their legs bud forth and they become ready to live on land, for it requires too long a time, but we may keep the toad tadpoles and watch the limbs gradually appear and the tail disappear until the adult form is reached. The little tadpoles will devour the slime which gather on the sides of the aquarium, and they will also suck the juices of raw meat. They grow rapidly and in a short time acquire legs and lose their tails, and, though still no larger than peas, they are perfectly formed toads ready to take up a terrestrial life.—*F. P. G., in Outdoor World.*



Sea Horse from New Jersey Coast.

Instructions Relative to Shipping Fresh Fish and Other Animals.

The specimens selected should always be the most perfect procurable,

with fins unbroken, scales entire, and the body without bruises or marks. They should also be as fresh as possible. Those of the largest size are preferred, excepting in the case of gigantic species, such as the Horse Mackerel, Swordfish, etc., in which case a limit may be indicated by the expense of transportation and the convenience of shipping. The fishes with best defined markings and brightest colors should always be chosen; and both sexes should, as far as possible be represented.

Each should be enveloped carefully and tightly in cotton cloth, and sewed up. Paper may be used if nothing better is procurable, though much less suitable. Care should be taken before packing to have the fins laid back close to the body, so as to avoid the danger of breaking them. If necessary to individualize the specimens each should be accompanied by a suitable label. This may consist of stiff paper, written upon with lead pencil, (an ordinary shipping tag, answers well for this purpose,) and wrapped up with the fish or tied outside.

The best mode of packing fish for shipment to a distance is by means of ice and sawdust. For this purpose a box should be obtained large enough for the purpose and a layer, five or six inches in depth, of ice and sawdust well mixed together, placed in the bottom of the box. The ice should be broken to about the size of the fist, and there should be enough sawdust to cover it thickly; on this place a layer of fish, enveloped as stated; and if there be a second layer of fish, separate it from the lower, by a stratum of ice and sawdust. The top and sides of the box should also be filled in. It

may be well to have an inch of sawdust without ice on the bottom and the top.

If the fish are quite small and slender a number of them may be inclosed in one wrapper, care being taken not to allow them to come in contact with each other.

It is very important that the name and address of the sender be marked ineffaceably on the outside of the box as well as the notice: "*Fresh fish preserved in ice, handle carefully and keep in the coldest place possible.*" If Wickersheimer's solution, referred to below, is used, write, "*Fish preserved in poison solution.*"

Timely advice of the sending should be given by mail or telegraph, telling the exact date and mode of shipment, so as to be received before the parcel arrives.

As far as possible packages from any distance should be sent in the early part of the week, so as not to be in danger of being kept over Sunday in the express office in Washington or elsewhere. They should be properly addressed and indorsed outside with name and address of sender, and nature of contents.

If the fish are to be sent for a longer distance than that requiring one or two days in transit, they may be treated to great advantage by means of what is known as Wickersheimer's solution, the formula of which is given below. In this event a sufficient amount of the solution may be first poured down the throat into the stomach, then by means of a syringe, injected into the anus and then into the abdominal cavity through a cut made for the purpose. Injection through the heart or aorta is of course best



"Fossil Plum"?

where the necessary skill is available. As, however, the solution is highly poisonous, it will be necessary to state the tact of its use on the outside of the box to prevent the fish from being accidentally eaten. • It is probable that this solution will, in itself, keep the fish in good condition for a number of days, even without the use of ice; although to make sure of this, it should be injected into the aorta or heart as stated above.

The instructions given above will answer in general for reptiles also. Mammals may be treated in a somewhat similar manner; but birds would be injured by the melting ice. The Wickersheimer solution will probably preserve them very well without any further treatment, except that of enveloping them, to prevent the feathers from being disturbed. The original formula of this was given in grammes and litres, but the quantities have been reduced and a sufficiently close approximation made into grains and quarts to answer the purpose. As stated by Wickersheimer the formula is 100 grammes of alum, 25 of salt, 12 of saltpetre, 60 of potash, 20 of arsenious acid, and three litres of boiling water. To each 10 litres of the cooled and filtered solution add four litres of glycerine and one of alcohol.

The recipe of Jean Wickersheimer, Taxidermist of the Berlin University,

for preserving animal substances for an indefinite period of time in their natural condition, has been purchased by the Prussian Government for free use throughout the Empire. It is used both by injection and immersion of the object, and is prepared as follows: Take of alum 500 grains.

common salt	125	"
saltpetre	60	"
potash	300	"
arsenious acid,		
(common arsenic) 100		"

Dissolve these in one quart of boiling water. The liquid is then to be cooled and filtered; and for each quart of the solution add four-tenths of a quart of glycerine and one-tenth of a quart of alcohol.

For small objects immersion in the solution for from 6 to 12 days will be sufficient; larger ones are better preserved by injection.

Caught a Sucking Fish.

A striped remora, or sucking fish, was found recently attached to the bottom of one of the steam launches which run around Glen Island, says the *New York Sun*. It was transferred to one of the large tanks of the Glen Island aquarium. The fish though not rare, is a deep-sea fish, and is hard to capture. It grows to the length of twelve to eighteen inches. The flat top of its head is surmounted by a large sucking disk extending from near the tip of the upper jaw to the ends of the pectoral fins, or about one-third of the total length of the fish. The disk is made up of seventeen or eighteen pairs of bony laminæ, the edges of which are furnished with rows of minute tooth-like projections. With

this disk the fish attaches itself to a shark, a turtle, or some other larger fish, and is in this manner drawn through the water without the exertion of swimming. Occasionally it will release its hold long enough to swim off and get something to eat, but immediately returns to re-fasten itself.

The South American Indians make use of this instinct of the fish to catch sea turtles. They fasten a ring around the remora's tail to which they attach a long line. The fish is then taken to sea, and when a large turtle is sighted the remora is thrown overboard. It unerringly swims to the turtle and makes fast. The line is then drawn in, and soon both turtle and remora are in the boat. It is necessary, however, to wait until the fish feels inclined to let go, for it is impossible to detach it from the object by force without injury.

Annual Meeting of the American Association for the Advancement of Science, and Affiliated Societies, at Springfield, Mass., August 29. 1895.

Among the many papers offered at the preliminary meetings two brought before the Entomological Society attracted general attention for local as well as scientific reasons. One of these was about that imported pest, the Gypsy moth, whose ravages it is costing so much to hold in check. The moth was introduced into this country twenty-six years ago by the astronomer Trouvelot, of Medford, Mass., who was at that time experimenting in raising silkworms. He placed his moths on some shrubs as soon as they arrived from France and

covered them with mosquito netting; but during a storm the netting was blown away and the insects escaped. Professor Fernald, of Amherst told the story of the subsequent spread of this moth and of what was being done for its extermination. He said that the species spread rapidly, eating all the leaves and killing all the trees in the vicinity. They would spread over a house so thickly that one could not tell the color of the paint, and they covered the sidewalks so that one could not step without killing numbers of them. The public became alarmed. Bulletins were sent out and copies of the official report were sent to every voter in Massachusetts. Commissions were appointed and large appropriations were made by the legislature. Experts were consulted by whose advice Professor E. H. Forbush was made field director, while Professor Fernald was retained as special entomologist. It was found that native parasites were at work on the moths; but it was not thought best to wait for the result of their work. Paris green was used and numerous other insecticides. Finally it was found that the arsenate of lead could be used effectively in large quantities and without injury to the trees. Waste lands may be burned over to advantage. The eggs can be killed by a combination of carbolic acid and creosote. The territory now infested covers 200 square miles in thirty towns and cities. The female does not fly but crawls at the rate of 142 feet a day, and will eat 200 square feet of lettuce during its lifetime of twelve weeks. The subject was discussed by Professors Riley, Forbush, Lintner and others, and a resolution unanimously passed approv-

ing the work already done by the Gypsy Moth Commission and urging the State to give it all needed support and encouragement.

The elm leaf beetle and the methods of his extermination was handled by Professor L. O. Howard. This pest is comparatively new in New England, though it has been at work in Washington and other Southern cities for forty years. But it is spreading up the Hudson and along the Connecticut River, and is far more deadly at the North than it has been in the South. Handsome old trees have been killed by it in three consecutive years, because the shortness of the season gives them no chance for refoliation such as there would be in the longer summers of Virginia. Arsenical spraying is the most effectual remedy, especially if combined with scraping and the use of keroséne to kill the larvæ around the base of the tree. This may be trite instruction, but the main thing is to get people to do the practical work needed. It is a striking fact that in most of our cities no appropriations are made for the care of our noble shade trees. Every city should set apart from \$1,000 to \$2,000 annually to the killing of shade tree insects, and for many places it would be economical to provide a steam spraying apparatus throwing from four nozzles as many gallons a second. Something has been done by private enterprise, as at Bridgeport, where more green elms can be seen than in other neighboring cities as the result.

Mr. W. S. Bullard is a pioneer in this work. But public sentiment should be aroused to demand the appointment of regular city foresters with sufficient funds. Beware of pat-

ented or secret mixtures, like those sold by the Norwalk Tree Inoculating Company, whose preparation is simply sulphur and carbon, and is wholly useless. Professor C. L. Marlatt also read a paper on the elm leaf beetle in Washington, claiming that early and thorough spraying was the key to the situation there and elsewhere.

Passing over the proceedings of the other affiliated societies, full as they were of material for thought and additions to knowledge, we come to the beginning of the sessions of the parent Association for the Advancement of Science, without which the minor organizations might not have sprung into existence, or at least would not have been grouped thus delightfully together. The duty of preparing the general business devolves on a council, to whose intelligence and activity we owe the success of every detail. They depend in turn, for the local features, on the committee of the citizens of Springfield, who engaged the halls for the meetings and planned various excursions, and did other work that costs much thought, considerable money and great patience and wisdom. Every attention that could be desired was paid to the distinguished scientific guests, together with the less brilliant seekers after truth who perhaps may shine in future assemblies. Indeed it is interesting to note the number of young persons who avail themselves of these privileges.

The reception at the Art Museum on Wednesday evening, August 28, was given by the City Library Association, of which Colonel James A. Rumrill is the president, and the occasion was made remarkably by the opening of the G. W. V. Smith collection of

paintings, ancient armor and costly implements of warfare of many nations, an attraction of which Springfield is justly proud. Mr. and Mrs. Smith, and the artist, Mr. T. W. Wood, of New York were present and assisted in receiving and entertaining the hundreds of guests.

After President Brinton's annual address on Thursday evening, read in his absence by the general secretary, another fine reception was given in City Hall by the Ladies' Reception Committee. The preparations were elaborate and the floral decorations and music were charming. The hours were spent altogether socially, in renewing old friendships and making new ones.

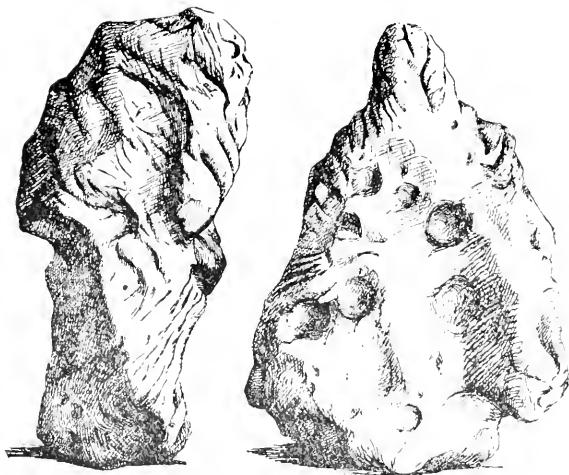
The General Sessions of the A. A. A. S. began on Thursday morning, August 29. A letter from the retiring president, Dr. Brinton, stated that he was detained in Europe on account of Mrs. Brinton's health. In his absence the duty devolved on Professor W. H. Brewer, of Yale University, to introduce the president-elect, Professor E. W. Morley, of Cleveland, Ohio, which he did with some complimentary remarks on the eminent services rendered by the latter to science. He was formerly an assistant to the famous Bunsen, in Heidelberg. He was one of the two men who solved Sir William Thomson's problem that excited so much attention at the time. He also won fame by determining the atomic weight of oxygen. He is now the professor of chemistry in the Western Reserve University, of Cleveland.

After thanking the association for the honor conferred on him, the president called on Rev. Bradley Gilman

to offer prayer. Mr. William H. Haile was then introduced, who made a happy address of welcome, in which he was followed by Mayor Long, who briefly recounted the victories won by science since the association had last met in Springfield. President Morley made a reply in which he paid a tribute to the famous men of Western Massachusetts past and present. He also stated in brief the aims of the organization now convened, and in closing said: "We study the apple tree and also the lily, the latter because of its ministrations to the intelligence and to the aesthetic side of life. We are not warmer nor richer for knowing the distance of the sun but some of us are happier for knowing it. So we, who are fascinated with science, ask you to receive us, not as engineers promising new structures of flying ships, or new conveniences with which to ornament our homes; nor as ethical teachers, but as men who can bring out the subtle influence of the lily, and appreciate the hidden beauty and meaning of what may seem to be abstract and almost unknowable things."—*Scientific American*.

Meteorites.

Meteors, Meteoric Stones, Fireballs, Shooting Stones, etc., are now all classed together as being mainly varieties of the same phenomena. They are, however, divided for convenience into three classes: First, Siderites, those composed mainly of Meteoric iron; second, Siderolites, being composed mainly of masses of iron and stone; and third, Aerolites, being composed almost entirely of stones. We shall only mention the first kind in this paper.



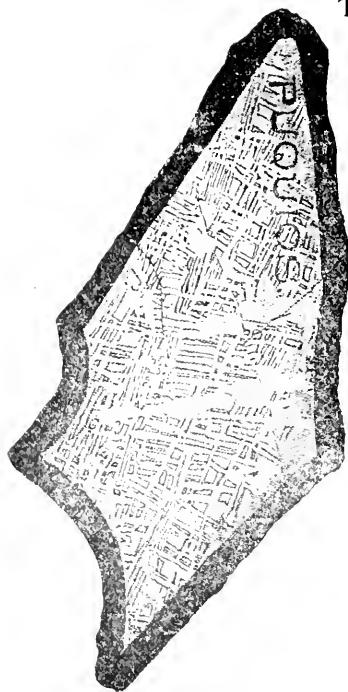
The La Bella Roca Meteorite, front and side view.

Those that fall during the day appear to come from a dark cloud, and are accompanied by a loud noise as of distant thunder. Some writers assert that if the same Meteors were seen by night the dark cloud would appear luminous. It was not until recent times that they were treated with any credulity, but were classed with the many things that we did not understand, but took for granted just as they are. One peculiar feature connected with Shooting Stones is that certain appearances of them are periodic. On most occasions they appear singly, and traverse the sky in all directions. At other times they have been known to appear in swarms of thousands, moving parallel.

Attention was first directed to this fact on occasion of the prodigious swarm which appeared in North America about the 12th or 13th of November, 1883, described by Prof. Olmsted, of Yale College. The stars fell on this occasion like flakes of snow to the number, as was estimated, of 240,000,

in the space of nine hours, and varying in size from a moving point or phosphorescent line, to globes of the moon's diameter. It was a queer fact that they all appeared to proceed from the same quarter of the heavens.

To come down to more recent times we have figured four Meteorites in this number of the MUSEUM, one of which we show a polished section. The specimens figured are all from the collection of Prof. H. A. Ward, of Rochester, N. Y., where they may be seen at any time. *The La Bella Roca Meteor* was found on the peak of the Sierra de San Francisco, in the state of Durango, Mex., in 1883. The two greatest dimensions of the mass were 25x35 centimeters. An idea of the general shape and appearance of the mass may be obtained from the cut which shows what is supposed to be the front and back of the Meteorite, at least during the latter part of its flight. One of its prominent features is the presence of large, deep pittings on one side. These are a little great-



Section of Puquios Meteorite, polished.



El Chanaralino Meteorite, 1-4 natural size.

er in diameter just below than immediately at the surface, and each one has a little substance left at the bottom, evidently the remains of what originally filled the cavities, which proved on analysis to be Troilite. The exposed surface of the Troilite was greatly decomposed. This decomposition gives grounds for the idea that the big pittings were formed by the removal of Troilite Nodules, partly while the mass was hot, and partly by the subsequent weathering. There are Nodules of Troilite throughout the entire mass of the Meteorite; but none are removed, so as to form pittings on any other side of the surface than the side which is supposed to have been the front. The mass is deeply furrowed, as may be seen to some extent in the figure; and all the furrows tend away from the side containing the pittings.

The *Hamilton County* Meteorite was secured from Prof. Edgar Everhart, of the University of Texas, and was found in the northern part of Hamilton County, Texas. The features connected with the finding are as follows: In April, 1887, while plowing in his field, about five miles south of Carlton, Hamilton County, Texas, Mr. Frank Kolb struck with his plow what he had first supposed to be a stone, but which proved to be the Meteorite in question. The specimen when secured weighed 179 pounds, and was entire with the exception of a few ounces cut off by Prof. Everhart for analysis. The thinner end had been pounded considerably, and some small fragments may have been detached so that when found the weight might possibly have been 180 pounds. The two greatest diameters are $17\frac{1}{2} \times 13$



Hamilton County Meteorite.

inches. The general form is well shown in this cut, the under side being smooth and less sharply pitted than the upper side, which was probably the forward portion during the latter part of its flight, but the iron although a very little oxidized, shows none of the characteristic striae and ridges, seen in irons that have recently fallen. The amount of Troilite found in cutting the iron is not great, and seems to be all distributed in comparatively narrow plates, no Nodules having been seen. The largest example is six inches in length and less than $\frac{1}{4}$ inch in average thickness with an unknown width of certainly over $2\frac{1}{2}$ inches. It is quite irregular in outline, and terminates at one end in a star which points about $\frac{1}{2}$ inch long.

The *Puquois* Meteorite was secured from the wife of a gentleman living at Copiapa, Chils, April 26, 1889. According to the Senora's statement it was found by her husband four or five years before, probably in 1884, near Puquois. The iron was got to the United States in absolutely perfect condition. It had apparently laid for a considerable time, one half buried in the soil with its upper surface exposed to the weather and drifting sand,

which combined to bring out the structure of the iron without oxidation making an exceedingly interesting and attractive object. The general form of the Meteorite was such as might result from the wearing away of a rhombic prism, one end wearing thinner than the other. The surface is quite smooth, showing few shallow pittings. The two largest diameters are $10 \times 5\frac{1}{2}$ inches and the weight 14 pounds, $7\frac{1}{2}$ ounces. Although the surface of this iron is unusually interesting the interior proves to be still more so. The etched sections show that the mass has been subjected to fracture and dislocation resulting in the distinct and undoubted "faulting" of the Widmanstatten figures and of the Troilite. Most of these faults are so small and fine that they cannot be seen in the illustration, but in the cut of one of the etched sections shown herewith which is $\frac{3}{4}$ natural size and which was produced by photographic process, three of these lines of "faulting" may be seen which is the especially interesting feature of this Meteorite.

The El Chanaralino meteorite, a beautiful siderite was found by Prof. Ward in the music store of Senor Kissinger, in Valparaiso, Chili, S. A., in

May, 1889, where it had been deposited by the owner, Lorenzo Sundt, who said that he purchased it in 1884 of a woman who kept a green grocery store at the port of Chanaral, Chili, (latitude about 26 degrees south). When first seen by him it was surrounded and partially covered with onions, and a spider had made its home in a specially deep pitting.

It had been brought in from near the mining camp of Merceditas, ten or twelve leagues to the east of Chanaral, by the woman's husband a miner, who thought it must be silver.

The general form of the meteorite is, as shown in the illustration, unusually angular with no rounded corners. In addition to the usual pittings, which are well marked and characteristic on all sides, there are numerous small pittings, apparently of latter formation, arranged in parallel rows about half an inch apart. These bear no relation to the other pittings, but are evidently referable to the structure, and although more numerous in some places than others are seen on all sides, and arranged in planes that cross those of the adjacent sides at right angles, approximately. Some of those on two sides may be seen in the illustration. This meteorite measured thirteen by nine inches and weighed 94½ pounds.

By running a gang of six saws through it, cutting it into five sections and two end pieces, it revealed several large nodules of trolite, directly in the centre of some of which, and entirely surrounded by the trolite, are nodules of iron. An etched surface of one of these sections is suggestive of a Scotch plaid, so broad and straight are the markings, two sets of which

cross each other at nearly right angles, while a third set crosses one of these at an angle of 12 degrees. Some of the more prominent lines of kamesite are about half an inch apart, and suggest very strongly, both by their direction and spacing a relationship to the lines of small pitting on the outside.

We cannot close this sketch without giving a brief description of the Farmington, Washington Co., Kansas meteorite.

On Wednesday, June 25, 1890, at 12:55 Central time, a roaring, rumbling sound was heard within a radius of 100 miles around Washington, Washington Co., Kansas, and many observers noted a meteorite traveling from south to north, which in its course left a double trail of smoke. The sun at the time was shining brightly, and hence no light was seen. The explosion was likened by various observers to a bolt of lightning, the bursting of the boiler of an engine or the boom of a distant cannon. The largest portion weighing 180 pounds, struck on the farm of W. H. January, who was greatly alarmed, as it struck very near him while he was under his wagon repairing it. This piece penetrated the hard, shaly earth to a depth of four feet. 40 pounds of it were broken off and distributed before it was placed on exhibition, after which the main mass, weighing 136½ pounds, was sold and resold several times, and now is in the collection referred to above.

A distinct mass weighing nine pounds, now in the possession of George F. Kunz of Tiffany & Co., New York City, was found on the farm of John Windhurst; and it is evi-

dently this piece which made the second trail of smoke.

The sound was noticed throughout a number of counties, both in Kansas and Nebraska, as a thunderous roar which at Clifton, 25 miles from the point of fall, was heard above the noise of a passing railroad train. The meteorite was seen over a much wider area than even its sound covered. Reports of observers are given from many places, ranging from Beatrice, Neb., 40 miles northeast of the point of fall, to Cedar Junction, Kan., 130 miles southeast, and Halstead, Kan., an equal distance south by west. To those north of the point of fall, it appeared as a brilliant object moving southward; while to observers south of that point, its motion seemed northward. As Prof. F. H. Snow—who gives a very full account of the circumstances attending the fall—remarks, these facts indicate that its descent must have been not far from vertical, as is also shown by the nearly perpendicular hole, about four feet deep, which it made in the earth where it struck.

The actual fall was witnessed by Mr. January, as he came out from under his wagon, alarmed by the extraordinary noise; and also by Miss Guild, a teacher in the Washington County Normal Institute, who was driving on the neighboring road 100 yards distant. Both came to the spot in a very few minutes; and Mr. January began promptly to dig for the object, and with the aid of neighbors reached its upper surface in an hour. But so firmly had it embedded itself in the shaly clay, that it was three hours before it was removed. When reached it was not hot. It had cracked in-

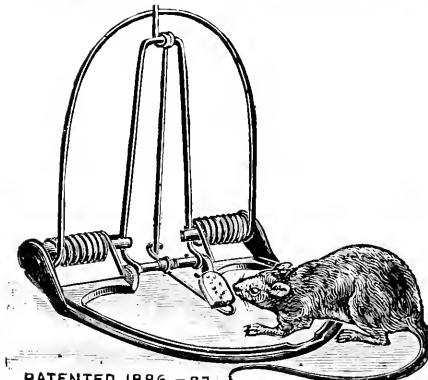
to two portions, the smaller of which was the 40 pound mass which was broken up and carried away by the people of the neighborhood.

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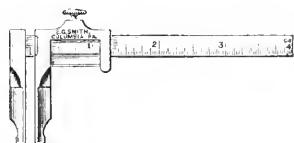
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NO. 12

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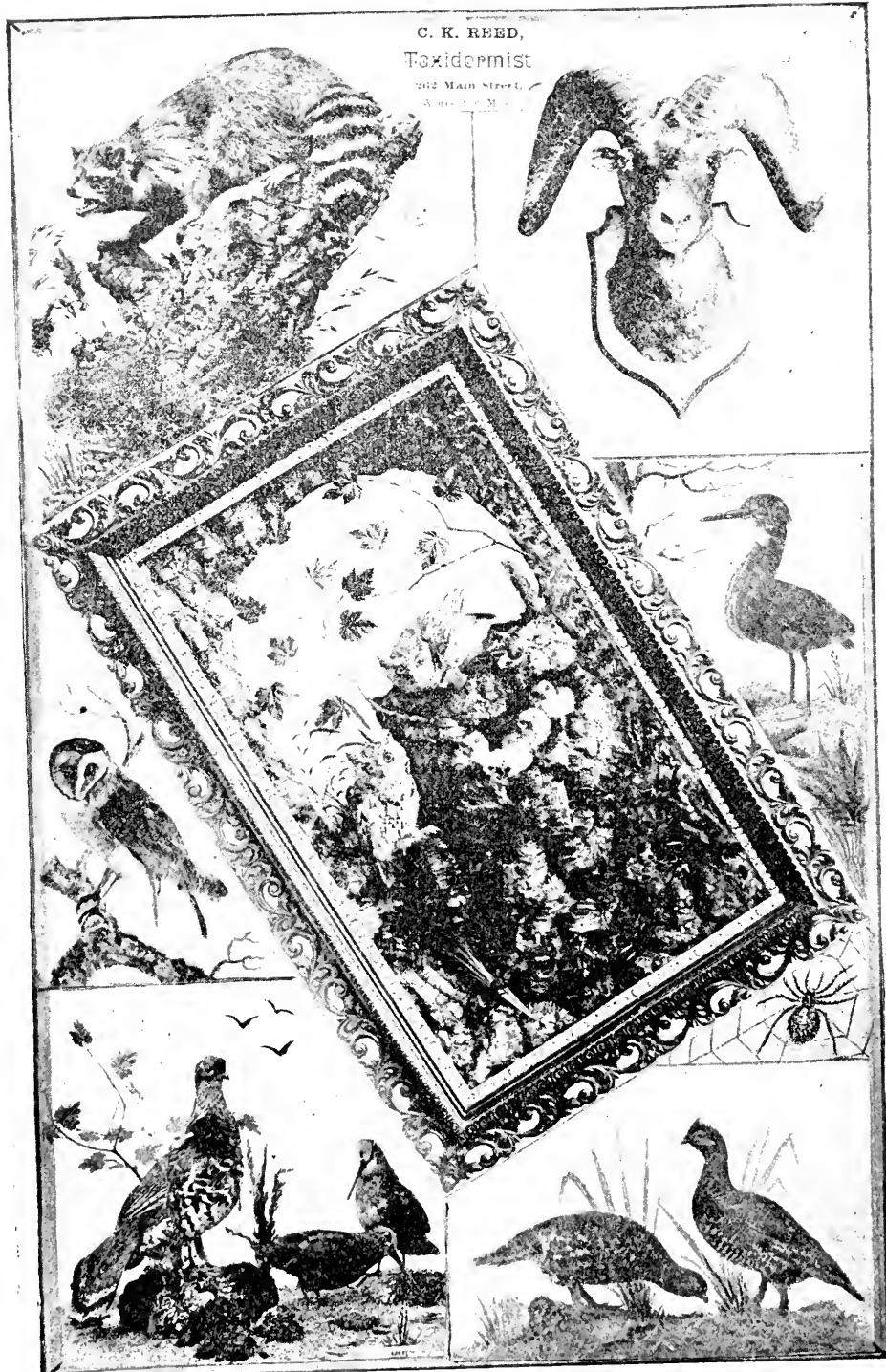
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THE MUSEUM.

A Monthly Magazine Devoted to Research in Natural Science.

VOL. I.

ALBION, N. Y., OCT. 15, 1895.

No. 12

Charles Valentine Riley.

It is with deep sorrow we record the death of this distinguished and indefatigable worker in science. In Washington, on the morning of the 14th of September, in company with his son, Prof. Riley started on his wheel for the city from his residence, Wyoming Avenue. They bowled on at a fast rate all along the route, and when the level space was reached at the foot of the hill, where Connecticut Avenue intersects with S Street, the wheels were flying with more rapidity than the careful professor usually attained. Suddenly the front wheel of his machine struck a small rock and twisted completely around. The shock was so sudden that Prof. Riley was thrown violently forward over the handle bars and landed on his head and face. He retained his hold on the handles, however, and the bicycle fell on top of him. He was unconscious when picked up.

A number of physicians were summoned at once, and within a few minutes the sufferer was receiving treatment.

Blood was flowing from the ears, indicating that there was a fracture of the skull. He seemed to be almost at death's door when he was lifted into the ambulance and carried to the home from which he had gone in full health and vigor but a few minutes before. The skull was found to be fractured at the base of the brain. The patient

gradually sank, and at 11:50 P. M. life passed away.

Charles Valentine Riley was born in London, September 18, 1843. His early life was spent in rural England, much of it in the pretty village of Walton, On-the-Thames, between Hampton Court and Windsor. At the age of 11, he entered the College of St. Paul, Dieppe France. After three years' attendance there he spent three years more in a private school in Bonn, Prussia.

Even in these early days his talent for drawing was noticeable, and curiously enough, as an indication of the future, he had a great fancy for producing exquisite delineations of butterflies, moths and other insects.

While his drawing teacher, Prof. A. Hoe, was urging him to repair to Paris and devote himself to art, he was by family circumstances thrown upon his own resources, and at the early age of 17 he sailed for America, went West and settled with Mr. G. H. Edwards, Kankakee County, Illinois, on a stock farm.

Three years were spent here, years during which the boy was distinguished by his love of work and by a most marked tendency for original research, which took the direction of the improvement of farm processes and farm stock. Those who know him say that he would have made a mark as an agriculturist had not his health failed him under the great strain, so that at the age of 20 years he went to Chica-

go. Here he had his early trials. He actually worked in a pork packing establishment, made portraits of his fellow boarders and made sketches which he personally sold to appreciative purchasers. At last he obtained an engagement as a reporter on the Evening Journal, and next changed to the Prairie Farmer, at that time the leading agricultural paper of the West. His especial department was botany and entomology, and in the interest of that department he traveled extensively. His enthusiasm, industry and versatility soon made his services invaluable. A curious illustration of the bent of his mind is shown in the fact that he here learned type-setting, simply because he was determined to have some trade at his command. The development of insects was one of his main studies, and the results of many original investigations and the answers to many inquiries were published by him in this paper. In May, 1864, he enlisted in the army, serving for six months with the 134th Illinois volunteers. The regiment disbanding six months later, he returned to his paper, severing his connection with it in the spring of 1868 to accept the office of State Entomologist for Missouri. At last we find him fully launched upon his career, and from 1868 to 1877 he did the work which firmly established his international fame.

His salary was but \$3,000 per annum and there was no allowance for expenses. Out of this amount Prof. Riley paid his assistant and large traveling expenses. He also paid for the beautiful illustrations of the reports, which illustrations were drawn by himself. The original edition of the reports have been long exhausted, and

any copies now bring very high prices. Charles Darwin, the famous naturalist, gave them the highest encomiums. In connection with Mr. B. B. Walsh, Acting State Entomologist of Illinois, Prof. Riley established the American Entomologist about this time.

In 1873 a bill was passed creating the United States Entomologic Commission, with Prof. Riley as chief, and Dr. A. S. Packard, Jr., and Cyrus Thomas as his associates. This commission was designed to cope with the Rocky Mountain locust, then doing great damage, and in five years of its existence published five large, fully illustrated reports, besides seven bulletins, all the work being done by three members.

Since this period, with an intermission of two years, Prof. Riley held the position of United States Entomologist, which he resigned a few months ago. His work at Washington fully upheld the promise of his early years. In carrying on the operations of his department, working night and day, year after year, without rest, i.e. nearly ruined his constitution. To the National Museum he presented his magnificent private collection of insects, representing the labor of twenty-five years. With it as a nucleus he built up a collection unsurpassed in America.

Keokuk Geology.

Keokuk, Iowa has a geological record that in some respects is quite unique. 12 miles north of the city, the great Father of Waters begins a headlong descent of 24 $\frac{1}{2}$ feet in that distance, known as the Des Moines Rapids, which caused such serious in-

terruption to navigation, that the government thought it advisable to construct a canal to obviate the difficulty. The rock is limestone, of a very hard and durable nature. Some of it actually passing the border line into marble.

Like other Palaeozoic rocks, these strata had their birth in an open sea. And they are mainly formed of the remains of animal life, every one of the five sub-kingdoms of which is represented in these rock strata that underlie the city. Protozoa are not largely represented by fossil remains. Two species of sponge are known. But of Radiates there is a better showing; for *Zaphrentes* is a rather common coral, and Crinoid remains, in the way of detached broken arms and stems, are plenty. The perfect fossil is not easily obtained, but sometimes many species are found crowded together in a small space, so that from an area of ten feet square, 200 have been procured, seeming to show either a gregarious habit in the animal, or a retreat into protected places for safety, or a more congenial place of growth because of currents then existing, or in the amount of food wafted to those favored localities.

The following genera are most largely represented viz: *Actinocrinus*, *Forbesioerinus*, *Cyathocrinus*, *Platycrinus* and *Agarioerinus*.

The Molluscan remains are well represented by Brachiopods, of which the genus *Spirifir* is, perhaps most abundant, yielding seven or eight species. Also *Orthis* is quite abundant. The Gasterpods make a poor showing.

Of Vertebrates there are the remains of many Selacian, or Cartilage fish, in

the way of teeth and fin spines. So that taking the number of these found in this locality, seems rather to add another doubt whether the sub-carboniferous is not really better entitled to be called the "Age of Fish" than the Devonian, as that has usually been styled.

The upper beds of the Keokuk formation properly are famed for their Geodes. I think a true explanation of how these have been formed is yet wanting. It is easy enough to call them "*Genus Biopella*," but how formed this interior lining of crystals, of quartz, or calcite or both, as the case may be, sometimes almost to the obliteration of the internal space. The Geode sometimes contains liquid, but if all had originally been filled with the most concentrated solution of silica or lime carbonate, it would, by evaporation, be entirely insufficient in quantity, to yield the interior lining of crystals. After the crust of the geode was formed, being very generally impervious to water, no solution holding material could find its way inside. Besides, when at home in their native bed, the matrix rock is a soft magnesia limestone, from which the desired material for the included crystals, we would rather suspect to be Dolomite or Calcite and not Quartz, which is most common. When the matrix rock in this vicinity approaches to a purer limestone in constitution, the geode seems to vanish—cavities in the rocks, often beautifully lined with crystals, taking its place, but the exterior shell is obliterated. It has adhered to, and become a part of the surrounding rock, and is not separable from it and the cavity very often

is not round. It is like the unripe nut inseparable from its hull. In fact the resemblance of the nut and geode is rather striking, though the impassable gulf between the organic and inorganic intervenes. The crystals in the geode represent the meat in the nut even to intricate foldings or globular, entirely—entirety enclosed by a shell in each case. The matrix rock representing the hull. May there not have been a similar growth in the two cases? An expanding process, by which crystals, shell, and rock all grew and formed simultaneously and access to the interior never incomplete until the whole was finished out of the surrounding formative material; so that a proper relative size of crystal and shell was retained at every step.

But to the burden of our text. The overlying St. Louis formation is, in its lower part, magnesian limestone beds, overlaid by a heavy bed of pure limestone concretionary at its outcrops, yielding the fine *Lithostrotion* Coral and often *Archemides*.

The lower coal seam lies unconformably on this; but it is of no economical value, being only a few inches thick. Over this comes a layer of sand rock, yielding the usual coral flora of *Calamites*, *Lepidodendron*, *Sigillaria*, *Stigmaria*, etc., and above all is a heavy coat of drift, where it has not been removed by denudation, capped by our usual surface soil.—*Geo. M. Crofts, Summitville, Iowa, in Natural Science News.*

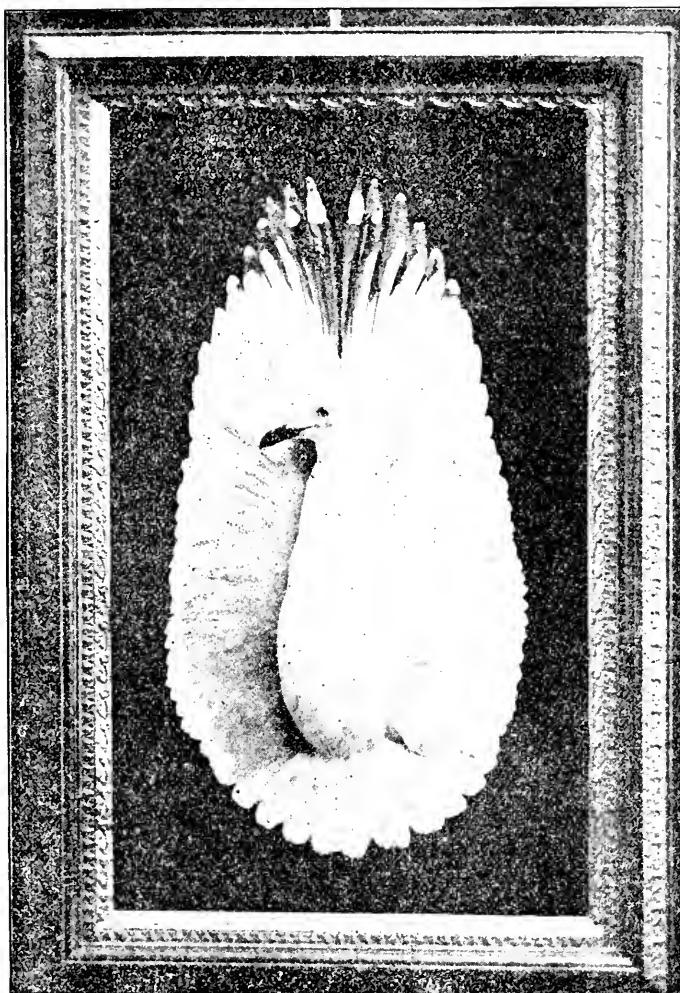
Roy G. Fitch of Grand Rapids, Michigan, was killed in the elevator at the Alan Sanitarium, at 7 o'clock on

the morning of July 18. He had been at that place for the past five weeks taking treatment for debility following a long attack of malarial fever, which he had last spring. He was much improved in health and was expected home last night to remain until Aug. 19, when he intended to enter the Agricultural College at Lansing.

When the accident occurred he was attempting to run the elevator in the momentary absence of the man in charge. Roy arose early yesterday morning and went down stairs. When he wished to return to his room there was no one to run the elevator and he undertook to manage it himself. He slipped and fell in such a way as to be caught between the cage and the wall. It was thought his injuries were not serious enough to have proved fatal, but the shock and fright produced heart failure.

Roy was a great favorite in his neighborhood and with his teachers and classmates. His disposition was gentle and affectionate and his habits were studious. He was a great lover of birds, and for several years had made their habits a study. He was vice president of the Kent Ornithological Society and he had a large collection of specimens and books that he shared with the club in pursuit of its studies. He was a frequent contributor to Ornithological literature, and perhaps was better known to our readers as "Amicus Avium."

Roy was nineteen years old, and had he lived he would have become eminent in the science toward which his tastes seemed to tend.—*Oregon Naturalist.*



American Herring Gull, under Oval Convex Glass.

Notes on the Northern Raven in Maine.

By A. H. NORTON.

In 1881 there appeared a note on the Raven *Corvus corax*, *C. c. principis* RICG., which further investigation shows to be quite far from presenting the true range of the race in Maine. Its distribution along the seaboard of Maine as now restricted, is from Small Point eastward, ranging to Harpswell in winter, "and Cumberland rarely"

(cf. Brown Proc. Part Sec. Nat. Hist. II, Pt. I p. 17.) Breeding regularly from the west entrance to Penobscot Bay, eastward, and presumably from Sequin and Muscangus Bay.

1885, April 19. In Knox Co. near St. George I examined a nest containing four fledglings, estimated to have been two weeks old. This nest was on a rough granite island lying about four miles off the coast, placed in a spruce tree *Picea alba* which grew

in the midst of a small clump of its species, the domicile being about 20 feet from the ground, against the trunk, resting on several horizontal branches.

Though no measurements were taken, the structure was slightly larger than a large nest of *Corvus Americanus*, with greater depth externally, and had the appearance of having been rebuilt from last year's service.

In composition, as well as position, it did not differ notably from that of the crow, except in lining, which was of wool, a material which I have never seen used as lining by the crow in this State.

When still about a quarter of a mile from the island we heard the adults croaking uneasily but on landing they were nowhere in sight nor did we hear them. As our boat thumped on the rocky shore, the young squalled in chorus and after which made no sound, even when I was at the side of the nest stroking their heads. Search showed that the parents had fled from the island, a habit, I am told, commonly practiced by them on the approach of man, and had it not been for the squall of the young there would have been no suggestion that we were at their breeding station, of so common an occurrence is it to see a pair of Ravens about any of these islands.

This observation indicates that their eggs were deposited in March (cf. Davie's Nests and Eggs of North American Birds 1889 p. 265-226.)

My companion of that trip, Mr. Fred Rackliff, informs me that he secured a set of fresh eggs from the same clump of trees, (and undoubtedly the same birds), a year or two later, near the 20 of April.

In 1891, October 4th and 5th while at Bald Head, Small Point, Me. in Sacgadahoc County I observed a pair of these birds, perched in a thrifty spruce tree, one on top, its mate half hidden in the dense foliage about two feet lower. They presented a striking picture of this species and one I can hardly hope to see bettered in a long time. They were at perfect repose, probably enjoying the evening glow of the rapidly sinking sun, nevertheless they were vigilant, and as I attempted to approach them under cover, they took their flight across a bushy pasture, lighting on an exposed and commanding perch about half a mile from the shore. This was on the fourth day of October, and on the morning of the fifth, at daylight, they came down, near our camping place, scanning the shore, stopping occasionally, croaking frequently, and launched out over the water, to the west across Anohog Bay, farther than the eye could follow them. Several hours later I had followed the same course and saw them feeding on the shores of one of the islands adjacent to Harpswell,—a distance of about ten miles, for this morning ramble.

1894, February 2 to 9, I spent camping and collecting in company of Mr. Rackliff, on the outer islands of Penobscot Bay, Knox Co., Me. during which time we observed one or a pair of these birds, nearly every day. During these days we experienced great changes of weather, from the most beautiful calm winter morning, when the great expanse of ocean glistened in the rising sun, followed by chilly afternoon with fretted ocean, when the distant islands, seemed dancing by the act of refraction; wild gales which

smote the ocean to a foaming flood; and days of less pronounced fury when the sun rode high, and glowed in mockery on the freezing earth, every boulder grew-glazed with a coat of ice from the restless ocean, which now was enveloped in a shroud of vapor, with long ragged pennants streaming skyward.

These were the conditions under which we observed the Raven.

During the wildest gale they seemed the most active, slowly but strongly flying against the howling wind, scanning the sea smote shore for such articles as pleased their particular tastes.

On the bright mornings, even the coldest, one resorted to a sunny glade and sang—not a song of bold or striking melody, nor vigor—but one remarkable for its simplicity and modesty, uttered in a deep tone, delivered slowly, and audible only at a few hundred feet at best. It could most nearly be imitated as follows, *oo oo oo, oo oo oo oo oo oo*. After a few repetitions of these sounds he gave vent to his loud croaks, probably the most popular character of the Raven.

Feb. 7. Mr. Rackliff shot one of a pair that was patrolling the windward shore of the island where we were then stopping. Dissection showed the bird to be a female, with a perceptible sign of activity in the avorie. The stomach contained a few barnacles, the abdomen of an insect belonging to the Hymenoptera, a few muscles *Modiola modiolus*, carefully shell-ed, and a few fish bones, with some vegetable matter. The collection seemed remarkable for the discrimination indicated. The barnacles and mussels, (not mentioning other Mol-lusks) occurred in countless thousands,

nevertheless the bird, shot at evening, had selected less than half a dozen individuals of both of these animals!

The birds, just previous to presenting themselves for a shot, had been in hot pursuit of a healthy Purple Sandpiper *Fringa maritima* which they closely followed on the wing, with the agility of a hawk. The bird escaped by dodging around a sharp rock, when the Ravens, without a stop resumed their course along the shore.

The Gigantic Birds of Southern Patagonia.

We are indebted to *La Nature* for a description of some of the extinct birds whose fossil remains have recently been discovered in the tertiary strata of Southern Patagonia.

These great birds, like those of Madagascar and New Zealand, were incapable of flying, but they differed much in their organization from the dinornis and aepyornis. The latter, like the ostriches and cassowaries, had a head and bill relatively small for their size. The gigantic birds of Patagonia had, on the contrary, a huge and strongly hooked bill (a true vulture's bill), so much so that they might lay better claim than the aepyornis to be identified with the celebrated roc of the Arabian Nights, if it could be admitted for an instant that the authors of those legends had seen anything of this fabulous bird but the egg, which are undoubtedly those of the aepyornis.

The geological strata from which Messrs. Carlos and Florentino Ameghino obtained these curious debris are the most ancient of the tertiary series in Patagonia. This region is now a desert, devoid of arborescent vegetation, and so destitute of water that ex-

plorers are forced to seek this precious liquid at a distance of twenty leagues and to carry it upon mule-back. The landscape, as in all Southern Patagonia, is despite the absence of forests, very picturesque by reason of its broken aspect, which makes it resemble a country in ruins. Everything indicates that this country was at a former epoch, deeply furrowed by water that flowed toward the sea, in consequence of an uplifting of land that exposed the strata which contained the fossils under consideration.

These strata are probably of the Eocene epoch and are called Pytherium, from the name of a large herbivorous mammal whose remains are found in abundance in the sandy and friable soil of this now dried up region. As in the Bad Lands of the Western Territories of the United States, it is not necessary to excavate the earth to a depth in order to find fossils, for the bones of large extinct animals are often found exposed upon the side of the declivities that border the road followed by travellers, and offer an easy booty to the paleontologist who may know their value and who for the first time travels over this wild country.

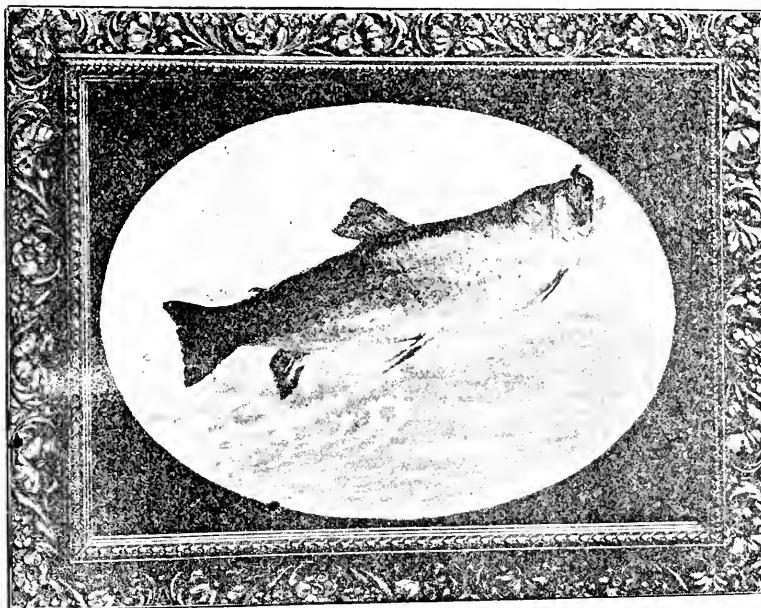
It was thus that Mr. Ameghino was enabled to collect the valuable remains that permitted of reconstructing a fauna that long ago disappeared. Some crania, some broken bills, some wing bones and some legs, often almost intact, give us an idea of the strength and proportions of these great birds. More than fifteen species of various sizes have been described.

The Phororhacos inflatus is the best known species. Of this we have an entire skull, with its lower mandible,

the bones of the legs and wings, the pelvis and some of the vertebrae of the neck and tail. Although it is not the largest species, it merits a few words, since a study of its characters gives us quite a clear idea of its organization and habits.

The bill is remarkably thick vertically and very much compressed laterally, like that of the rapacious birds. The hollow that precedes this hook presents two small teeth. If we compare this bill with that of our present birds, we shall have to set aside the vultures and other rapacious birds, all of which have well developed wings, and also the balaeniceps and the caneroma, whose wide and depressed bill resembles that of the phororhacos only in the terminal hook. But there is one bird not long extinct that exhibits undoubtedly affinities with the latter, at least by the form of its bill; we refer to the *Didus ineptus*, a large bird incapable of flight, which was still living on Mauritius Island during the course of the seventeenth century. This bird attained the size of a swan, but was of much heavier build. It is said that it fed upon vegetable substances, such as fruits and roots. It was a stupid animal and a poor runner, and this explains its rapid destruction, beginning from the time at which the Mascarene Islands were occupied by the Dutch in 1598. Less than a century afterward the species was completely extinct.

Although the phororhacos resembled the didus in its bill, it differed from the latter in the form of the pelvis, which was much narrower than that of the didus, and which indicates a lighter bird. In this respect the phororhacos more closely resembled the



Brook Trout, under Oval Convex Glass.

aphanapteryx or "snipe-billed red hen," which lived on Mauritius Island at the same epoch as the didus, and which like it, is extinct. The aphanapteryx belonged to the group of rails and had an affinity especially with the ocydromes of New Zealand. Its bill resembled that of the courli and the ibis, and its size was less than that of the didus.

The skull of the phororhacos is 14 inches in length, while that of the didus is but 10. A comparison of the limbs proves that the form of the phororhacos was not so squat as that of the didus, and was more comparable to that of the aphanapteryx. The measurements of the leg of the didus are as follows: femur, 6.5 inches; tibia, 9.5 inches; tarsus, 5.5 inches; altogether, 21.5 inches for the entire limb; while the phororhacos' leg measured as follows: femur, 9 inches; tibia, 16 inches; tarsus, 12 inches; in all, 37 inches.

The sternum of the phororhacos is not known, so that it is impossible to say whether it was carinate like that of the didus, as seems probable, or flat and shield shaped like that of the aepyornis. The feet have four toes, as in the didus, and the caudal vertebrae come to a point, as in the reptiles, instead of terminating in a tubercle giving attachment to the powerful muscles of the tail in all the birds that have this organ well developed. The bones of the phororhacos did not possess any cavities filled with air, but were filled with marrow like those of mammals. The bird was of an imposing stature and was comparable to the ostrich, but more robust. Another species of the same genus, the *P. longissimus*, reached great dimensions.

The skull of the last named species was 26 inches in length, a size that that of few mammals reaches at the present epoch. The skulls of the

horse, camel, and giraffe are much inferior in this respect. It was, says Mr. Ameghino, the most formidable bird's head that could be imagined. The form is that of the preceding species, but with proportions a third larger. The bones of the leg indicate an animal little inferior to the *Aepyornis ingens*. The leg bones of the latter, according to Mr. Oustalet, measured as follows: femur, 13 inches; tibia, 25·5 inches; metatarsus, 16·75 inches; say altogether a leg about 55 inches in length. These measurements are approximate and based upon a comparison of the bones, partly broken, with those of the preceding species. The toes, of which all the phalanges are known, are extremely large, that of the center being more than 15 inches in length, and its ungual phalanx alone measuring 2·5 inches in a straight line. This is strongly curved and pointed, and the basilar tubercle forming a heel is greatly developed—characters that are found again in the *didus* and indicate a poorer runner than the *aepyornis* and the *dinornis*.

If the *phororhacos* cedes a little, as to stature, to the *aepyornis*, the *Brontornis Burmeisteri*, of which it remains for us to speak, was certainly the most colossal of all the birds known. It was much more massive in build than the *phororhacos*. The bill, while possessing the same form, was shorter, wider and thicker vertically. The leg was really monstrous, as is shown by the following dimensions: femur, 16 inches; tibia, 30 inches; metatarsus, 17 inches; in all, 63 inches for the height of the haunch, say 9·5 inches more than the *Aepyornis ingens*. This bird must have been more than 13 feet in

height. The shaft of the femur was 3 inches in diameter and the head of this bone measured no less than 7 inches. The toes were shorter and more massive than those of the *phororhacos* and the ungual phalanges were much wider, flatter and less pointed, like those of running birds. The ungual phalanx of the median toe was 2·5 inches long and 2 inches wide at the base. These characters indicate habits somewhat different from those of the *phororhacos*. What were the habits of these large birds, so remarkable by reason of their strong hooked bill, so different from the short and conical bill that characterizes the *aepyornis* and *dinornis*? We know that the diet of the latter was almost exclusively vegetable, like that of the ostriches and cassowaries, but, when it concerns the *phororhacos* and the *brontornis*, it is difficult to admit that this powerful bill could have served only for pulling up roots and breaking branches of trees.

It is asserted that the *didus* fed upon plants solely, but the habits of this so quickly exterminated bird are scarcely known to us except from the stories of sailors who are ignorant and but slightly observant of things relating to nature. It is more probable that this large bird was omnivorous and fed indifferently upon fruits, roots, mollusks and reptiles.

Such must also have been the diet of the wingless birds of Patagonia, several species of which do not exceed our swans or the marabouts of Calcutta in size. What confirms this hypothesis is that Mr. Ameghino has found upon the skull and bill of the *phororhacos* certain exostoses and distortions that can be nothing but the trace



Bob-White, under Oval Convex Glass.

of deep wounds cicatrized by a deformed callosity. These birds, says Mr. Ameghino, were true ferocious beasts that engaged in frequent battles. It may be admitted, too, that these powerful bipeds did not fear to measure their strength with reptiles of large size.

The paleontological researches made by Messrs. Ameghino and Moreno teach us that, at the end of the cretaceous epoch, the reptiles, and especially the dinosaurians, were abundant and varied in the south of Patagonia. Mr. R. Lydekker has described their remains under the names of *titanosaurus* and *argyrosaurus*. It is even probable that this point of the globe is the last in which these gigantic rep-

tiles, so flourishing in the jurassic epoch, had representatives before becoming extinct forever. Like the *balæniceps* of the present epoch, which destroy many young crocodiles upon the banks of the White Nile, and like the serpentary of southern Africa, which makes bloody war upon snakes, and which is the only running rapacious bird known, the *phororacoses* must have given chase to reptiles, which their long legs allowed them to pursue into the swamps. Seizing such reptiles with their strong claws, they must have killed them with strokes of their bill in order to devour them afterwards at their leisure, when another bird of their own species did not come to dispute such prey with them.

The brontornis must have preferred dry ground, as is shown by the conformation of its toes, the nails of which must have become worn by walking, as in the case of the ostrich.

If we suppose that these large birds already existed in the cretaceous epoch, as seems probable, it is not rash to believe that the phororhachses and the brontornises did not remain strangers to the extinction of the dinosaurians of Patagonia.

The Smithsonian Institution and U. S. National Museum.

BY ALBERT B. FARNHAM.

To the bequest of James Smithson, an Englishman, the United States owes the establishment of the Smithsonian Institution of world wide fame. This bequest as first received was about \$500,300, but judicious investment has advanced this sum to \$703,000, yielding, at six per cent interest, an annual income of \$42,180. By the terms of the bequest the object of the Institution is the "increase and diffusion of knowledge among men."

Its work has been in two lines, one stimulating scientific inquiry and developing interest in various branches of knowledge, and the other of establishing at Washington an immense collection of books consisting of the transactions of learned societies and records of discovery and invention, as well as an immense National Museum of objects illustrating the animal, vegetable, mineral and industrial resources of North America especially.

The greater part of the Smithsonian Library of nearly a hundred thousand volumes is deposited in the Library of Congress. The National Museum to

the Smithsonian Institution was established by the Government in 1846. The means for the support of the Museum are furnished by Congressional appropriations. All specimens of natural history, mining, metallurgy, objects of aboriginal workmanship; etc., belonging to the United States are in this collection.

Within the walls of the Museum building a net floor surface of $2\frac{1}{3}$ acres is covered by roofs. It contains 17 large exhibition halls, 135 workrooms offices, etc., also about 4,000 square feet in the galleries for storage purposes. As a part of the work of the Museum, a working library, a chemical laboratory, photographic rooms, workshops for taxidermy modeling, preparing skeletons, etc., are also carried on.

But a faint idea of the magnitude of the collections here can be gained from this estimate of the number of specimens.

Antiquities and Ethnology	650,000
Arts and Industries	40,000
Fossil invertebrates and plants .	500,000
Marine invertebrates	500,000
Minerals and metals	70,000
Rocks and building stones	50,000
Ores and metals	50,000
Insects	600,000
Mollusks	425,000
Fishes	100,000
Reptiles	30,000
Birds and Eggs	100,000
Mammals	10,000

The Smithsonian building while poorly adapted to museum purposes is one of the finest specimens of twelfth century architecture in the country.

The main hall of the first floor of this building is devoted to the collection of birds, consisting of about 60,-

coo specimens. Of this number perhaps one-fifth are mounted and exhibited to the general visitor. The most of them are mounted singly in stereotyped museum style, but lately some grouping has been done. A group of Flamingoes, one of Jacanas, a nest of the Shrike with young and parent birds, a flock of Carolina Paroquets, feeding on cockle burrs and roosting in a hollow tree, and a number of others.

Marine animals, fishes and invertebrates, reptiles and batrachians and the immense Conchological department occupy the remainder of the first floor used for exhibition purposes. Much of this building is used for office purposes as well as those rooms mentioned in the Museum.

The main hall of the second floor 200 by 50 feet contains the most extensive archeological collection in the world in relation to North America certainly the largest and most interesting in this country, as illustrating the customs of early man the world over. One of the most valuable collections here is the Latimer Collection of Antiquities from Porto Rico, which Mr. Geo. Latimer, the collector, gave the Museum after refusing an offer of \$15,000 for it.

The Exhibits in the building of the Museum proper are so extensive that days might be consumed in examining them and to merely mention them all would require more time and space than can be found at present. Principal however are the historical objects and musical instruments of all nations in the North Hall. The mammals in the South Hall include some of the best examples of American taxidermy extant. The George Catlin gallery of

about 600 paintings illustrates life among 48 tribes of North American Indians, in the West North Range. The Northwest Range contains a splendid illustration of the Graphic Arts, ancient and modern.

The West Hall contains hundreds of invaluable Anthropological collections. In the mineral collection of the South West Range is the most extensive collection of meteorites in the country. The collections in the South West Court illustrate the mining of a great variety of ores and metals. A large collection of massive ore is found in the open air at the west front of the building.

In the Lithological collections in the West South Range are about 2,000 specimens of building and ornamental stones representing all the quarries of importance in the United States.

The skeletons and skulls in the East South Range are always interesting to the zoologist and have here been so arranged that the general public find them quite fascinating.

The South East Court is occupied by fossils, the South East Range by *Materia Medica*, crude and finished.

The East Hall collections are of weapons and armor, and implements of locomotion and progression and are intensely interesting as are the objects illustrating the Arts and Industries in the North East Court. Here is the exhibit of general taxidermy in the section of Animal Industries.

The ships and boats of all ages and nations are represented in the North East Range forming one of the most instructive exhibits here, attractive alike to young and old.

Fisheries of all kinds are fully illus-

trated in the East North Range by apparatus, models and pictures. The National Zoological Park is also an outgrowth of the National Museum, its nucleus being a collection of animals used for working models by the Museum taxidermists. The Park chiefly owes its existence to the efforts of Mr. W. T. Hornaday, former Chief Taxidermist.

One of the principal embarrassments of the Museum officials is the immense amount of material held by them; another building the size of the present one could probably be filled without exhausting the storage rooms.

Birds as Protectors of Orchards.

By E. H. FORBUSH, ORNITHOLOGIST,
OF THE MASSACHUSETTS BOARD OF
AGRICULTURE.

Having had, during the last twenty years, some opportunity for observing the food habits of birds, I have become convinced that they destroy enormous numbers of insects. This conviction gives rise to the question, to what extent are birds useful to man in this respect?

The present paper is merely a partial record of the results of an attempt to foster and protect birds in an old and neglected orchard with a view to observing the effect of such a policy upon the trees. The orchard is so situated as to be a favorite haunt for birds. It forms part of an estate in Medford, Mass., lying near the southern border of the stretch of wooded rocky hills known as the "Middlesex Fells," a large part of which is now under the control of the Metropolitan Park Commission of Massachusetts, and is being administered as a forest

reservation. The nearest estates on the east and west of the orchard are cultivated to some extent. There are other orchards in the immediate vicinity, and many fine and large shade trees. There are also on the estate in question many varieties of trees and shrubs. There is a small piece of woodland, covering perhaps an acre and a half, in which yellow pine predominates, the other trees being principally ash, oak and maple, some hickory and a few white pines. A lane running along the southern border of the estate is bordered on both sides with elms and poplars. A line of mulberry trees along the lane south of the orchard affords tempting food for such birds as are fond of fruit in its season. There are also many wild cherries and berries of several varieties, together with half a dozen trees of cultivated cherries.

Among the trees, shrubs and vines found on the estate and which furnish food for birds in the shape of berries or seeds at certain seasons of the year are the *Berberis vulgaris* (common barberry), *Vitis labrusca* (Northern fox grape), *Rhus toxicodendron* (poison ivy), *Prunus americana* (wild yellow plum), *Prunus pensylvanica* (wild red cherry), *Prunus virginiana* (choke-cherry), *Prunus avium* (English cherry), *Rubus occidentalis* (black raspberry), *Rubus villosus* (high blackberry), *Rubus idaeus* (garden raspberry), *Rosa nitida* (wild rose), *Pyrus malus* (common apple), *Ribes rubrum* (common red currant), *Fraxinus americana* (white ash), *Morus rubra* (red mulberry), *Quercus alba* (white oak), *Quercus coccinea* (scarlet oak), *Pinus strobus* (white pine), *Pinus rigida* (pitch pine), *Tsuga canadensis*

(hemlock), *Juniperus virginiana* (red cedar).

The orchard itself is a typical old orchard, such as is often found on small farms. It has suffered greatly from neglect. Two-thirds of the original trees have died or are in the last stages of dissolution. This is largely the result of neglect and improper pruning. Dead limbs and hollows in the trees have offered nesting places for such birds as the wren, woodpecker and bluebird.

For three years, from 1891 to 1893, inclusive, the trees were trimmed and cared for. They were sprayed or banded to protect them from canker-worms, and the "nests" of the tent caterpillar (*Clisiocampa americana*) were removed. The result was a scanty yield of apples from most of the trees. One or two bore quite plentifully.

In order to observe the effect of the feeding of birds in the orchard, no care was taken in 1894 to protect the trees. During that year the tent caterpillars were very numerous in the vicinity, and it became evident also that a great increase in the number of canker worms was taking place in the neighborhood. Although these insects made considerable inroads upon the trees, they did not seriously injure the foliage anywhere except in one or two instances. No attempt was made previous to 1895 to foster or encourage the birds in the neighborhood, except that a few nesting boxes were put up in 1894, which were occupied in one case by a family of wrens and in another by the English or house sparrow. We were careful, however, to destroy the nests of the house sparrow.

In the fall of 1894 it was noticed

that immense numbers of the wingless females of the fall canker-worm (*Anisopteryx pometaria*) were ascending nearly all the trees and depositing their eggs; also, that the eggs of the tent caterpillar moths were numerous upon the twigs promising a plentiful supply for 1895.

Having allowed the insects one year to increase unmolested by man, we began in the winter of 1894-95 to encourage the presence of birds in the orchard.

In 1894 a small tree in the centre of the orchard had been enclosed by a high board fence. The tree thus enclosed was used as an out-door experiment station for observation on the breeding and habits of the gipsy moth. During the winter 1894-95, Mr. C. E. Bailey made frequent visits to this tree to ascertain whether or not the birds were destroying the eggs of the gipsy moth. Incidentally, Mr. Bailey observed many interesting things in connection with the feeding of birds on the eggs, larvæ and pupæ of insects which winter on the trees, and I am greatly indebted to him for many interesting notes on the feeding of birds in this orchard. He is a careful, conscientious observer, and is intimately acquainted with most of our native land birds.

Hunters and trappers are aware that many species of winter birds, such as titmice, woodpeckers, crows, jays and nutatches are attracted by a skinned carcass suspended from a limb, and will remain in the vicinity until all the bones are picked clean or until, with the approach of spring, insect food becomes more accessible.

Believing from my own observations that the chickadees (*Parus atricapil-*

(*lus*) were feeding on the eggs of the fall canker-worm, I asked Mr. Bailey to attract the birds, if possible, to the orchard by suspending pieces of meat, bone, suet, etc., from the trees. These food materials are suitable for birds at times when the trees are covered with snow or ice and, when lacking such nourishment, they might starve. Although birds will frequently visit bait provided for them and in time will eat a considerable portion of the meat, they do not depend entirely on this aliment, but spend the greater portion of their time in searching for insects and eggs in the immediate vicinity.

Finding a plentiful supply of food, the chickadees remained about the orchard most of the winter, except for a week or two, when the meat gave out, but they were lured back again later by a fresh supply which was placed in the trees. Not only were the chickadees attracted to the orchard in large numbers, but other birds came also. A pair of downy woodpeckers (*Dryobates pubescens*) and two pairs of nut-hatches (*Sitta carolinensis*) were frequent visitors, and a few brown creepers (*Certhia americana*) came occasionally. All these paid frequent visits to the meat and suet, and also thoroughly inspected the trees in search of insect food. They made excursions also to the trees in the neighborhood, but the greater portion of their attention was confined to the orchard in which the bait was suspended. As they became more accustomed to Mr. Bailey's presence they grew quite tame and could be viewed at a distance of a few feet. Indeed, chickadees frequently alighted on his person and occasionally took food from his hand.

He was thus enabled to determine accurately (without killing them) what they were feeding upon, and was soon convinced that they were destroying the eggs of the canker-worm moth in large numbers, as well as the hibernating larvæ and pupæ of other insects injurious to trees.

To determine how many eggs a single chickadee would eat, a few birds were killed and their stomach contents examined, with surprising results. There was no difficulty in identifying the eggs of the canker-worm moth which were found in the birds' stomachs, as a great portion of the shells remained intact. The other insect contents of the stomachs were identified for me through the kindness of Mr. A. H. Kirkland, B. Sc., assistant entomologist to the State Board of Agriculture, who made the examinations. Although it was impossible in all cases to learn with certainty the species to which certain insects belonged, it was evident that they belonged to genera known to be of injurious habits.

I take the following from Mr. Bailey's notes:—

Number of Eggs of the fall Canker-worm found in stomachs of Chickadees.

No. 1	273	eggs.
" 2	261	"
" 3	216	"
" 4	278	"

Making in all 1,028 eggs found in the stomachs of four birds. Four birds killed later in the season had eaten the female imagoes of the spring canker-worm (*Palaeacrita vernata*) as follows:

No. 1	41	moths
" 2	18	"
" 3	27	"
" 4	19	"

Making a total of 105. In No. 2, 3 and 4 of the last table there were a large number of eggs also. It is safe to say that there were 150 eggs in each stomach, in addition to the female moths eaten.

Mr. Bailey carefully counted the eggs in the ovaries of twenty of these female moths, with the following results:

No. 1.....158	No. 11.....111
" 2.....272	" 12.....160
" 3.....127	" 13.....193
" 4.....184	" 14.....131
" 5.....213	" 15.....281
" 6.....135	" 16.....242
" 7.....140	" 17.....116
" 8.....220	" 18.....281
" 9.....200	" 19.....192
" 10.....130	" 20.....217

It will be seen from this table that the average number of eggs found in each moth is 185. Mr. Bailey is very positive, from his continuous field observations, that each chickadee will devour on the average 30 female canker-worm moths per day from the 20th of March until the 15th of April, provided these insects are plentiful. If the average number of eggs laid by each female is 185, one chickadee would thus destroy in one day 5,550 eggs; and in the twenty-five days in which the canker-worm moths "run" or crawl up the trees, 138,750. It may be thought that this computation is excessive, and it is probable that some of the moths were not captured until they had laid some of their eggs, but the chickadees are also busy eating these eggs. When we consider further that 41 of these insects, distended as they were with eggs, were found at one time in the stomach of one chickadee, and that the digestion

of the bird is so rapid that its stomach was probably filled several times daily, the estimate made by Mr. Bailey seems a very conservative one. He now regards the chickadee as the best friend the farmer has, for the reason that it is with him all the year, and there is no bird that can compare with it in destroying the female moths and their eggs. It was noticed that the birds made no attempt to catch the male moths. This, however, cannot be considered as a fault, for the birds accomplish far more by destroying the females than they would by killing males.

The following notes from the preliminary examinations of the contents of the alimentary canal of chickadees made by Mr. Kirkland are of interest in this connection:—

"Bird brought in by Mr. Bailey, March 16, 1895: Gullet empty. Gizzard contained 270 canker-worm eggs (*Anisopteryx pomaria*), 46 case-bearers (microlepidoptera), 6 cocoons of a small tineid (near *Aspidisca*). These three kinds of food in bulk composed 80 per cent of the gizzard contents, the remainder being dark material which I was unable to determine under a hand lens. I think it very probable that part of this was bits of bark or particles of bark-dust taken in with the eggs or cocoons. The intestine contained a large quantity of meat, 75 per cent, and 103 canker-worm eggs, 10 per cent, the remainder, 15 per cent, being material which I could not identify. It was not meat. This gives us as totals, 373 canker-worm eggs and 51 microlepidoptera.

"Specimens of so-called 'scales' on apple twigs brought in by Mr. Bailey, March 12, 1895. These are not bark

lice, but the cocoons of a microlepidopteron, probably a tineid. Length 1-12 to 1-8 inch; width, 1-12 to 1-10 inch; elliptical, dark brown or reddish brown. They are closely spun, the upper surface apparently being of leaf epidermis, while underneath is a small well-formed cocoon which contains a minute green larva which evidently hibernates as such, probably pupating in the spring. The larva undoubtedly feeds on the leaves of the apple-tree, as these cocoons were taken from the small twigs at the extreme end of a large branch. Some of these cocoons are empty and have a minute hole at one end, which probably served for the egress of some small parasite. These cocoons are eaten by the chickadee, and have been found in the gizzard of the birds."

The case-bearers and the tineids or leaf miners are injurious to the foliage of the apple-trees.

It was noticed by Mr. Bailey, who watched the birds closely for several days, that they were eating quantities of both of these insects. It would have been impossible for any one to determine the species of the leaf miners as found in the birds' stomachs, for little remained but small fragments of the shell of the creature. Mr. Bailey noticed that the birds were taking objects from the twigs, some of which they ate; others they rejected and dropped upon the snow. Some of those dropped he picked up and examined, finding them to be parasitized. The birds undoubtedly ate only those which were alive.

It was evident from a careful examination of the eggs found in the stomachs of the chickadees that they were either broken by the bill in such a way

that the contents were exposed to the action of the gastric juice or the gastric fluid destroyed a portion of the shell. Occasionally a few eggs which appeared to be whole were found in the intestines.

A great quantity of animal food is required to sustain life and provide animal heat sufficient to enable these little birds to resist the inclemency of our severe winters. In proof of this it may be stated that during favorable weather the birds visited the meat and ate largely of it three times each hour with fair regularity. During each interval they were occupied in destroying eggs and other hibernating insect forms which were always present and numerous in the stomachs examined. This feeding appeared to be almost continuous except in severe storms when the birds sought shelter or when they were laboring under excitement caused by fear, as in the case of a visit from a hawk, cat or shrike. Whenever a cat appeared they immediately hid behind the branches and remained quiet until the intruder had passed. The appearance of other enemies or the firing of a gun would produce much the same effect.

(*To be continued.*)

A Curious Collision.

While watching the antics of a number of Chimney Swallows, a few days since, that were circling above my head collecting their food, which they always get while on the wing, I saw two of the little fellows enter into a fight which finally proved fatal to one.

After keeping up the fight for a few minutes, high in the air, they descended to within a few feet of the ground, and both flew, struggling, toward a board fence, intending, I suppose, to go between two boards.

I heard them strike the fence and on going to look, found one little combatant dead. On examination I found that he struck full in the breast, crushing it in, which caused its death.

J. T. DALTON, Hampden, Mass.

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NOTES.

With this number we close Vol. 1 of THE MUSEUM. Notwithstanding many of our contemporaries predicted failure on our part, and wrote that a "general" Natural Science Journal could not succeed, claiming that the demand, these times, was for a magazine devoted to some special branch, we feel sure our readers will admit that THE MUSEUM is filling a long felt want. For our part, we can best judge by the number of subscriptions received and the entire satisfaction of those using our exchange columns and advertising space. It is a bona-fide success, both financially and otherwise—during the ensuing twelve months we propose to cover a larger field of usefulness. Our motto has been and ev-

er will be, "what we say we do, we do do," and our subscribers can depend on more interesting and newsy articles, more illustrations and more bargains. Many dealers are now contracting space for the entire twelve numbers of Vol. 2, advising us that the results so far, have far overlapped their most sanguine expectations. Many prominent writers have expressed willingness to contribute to our columns in their special line.

We include an index of contents of Vol. 1, including illustrations, which can be easily removed from this number and used in binding. We confidently hope to hold every subscriber so far secured and *add over Five Hundred* to commence with the November number who will thereby secure all of Vol. 2. Don't delay but send in your subscriptions at once. We shall send a "personal" letter to every subscriber whose subscription expires with this number, so please wait until you receive it. You will profit thereby and also aid us in the "good work."

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Geological Society and American Association Meetings.

By WARREN UPHAM, Cleveland, Ohio.

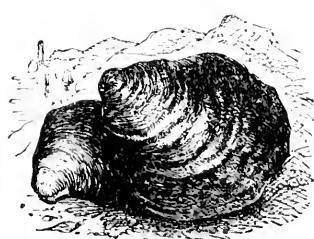
GEOLOGICAL SOCIETY OF AMERICA.

The seventh summer meeting of the Geological Society of America was held in Springfield, Mass., on Tuesday and Wednesday, August 27 and 28, 1895, under the presidency of Prof. N. S. Shaler, with an attendance of about forty fellows and friends of the Society. The meeting was in the beautiful new building of the Art Museum, then used

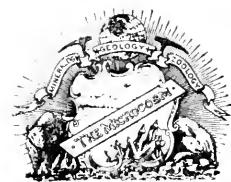
for the first time. Dr. William Rice, secretary of the Library Association of Springfield gave a cordial address of welcome. Memorial mention was made of Profs. James D. Dana and Henry B. Nason, fellows of the Society who have died since the last meeting; and biographic sketches commemorative of their work will be presented at the winter meeting. Eleven new fellows were announced as elected by the recent vote of the Society, namely, S. Prentiss Baldwin, Cleveland, Ohio O., C. Farrington, Chicago, Ill., G. P. Grimsley, Columbus, Ohio, F. P. Gulliver, Norwich, Conn., J. B. Hatcher, Princeton, N. J., Edward B. Mathews, Baltimore, Md., John C. Merriam, Berkeley, Cal., H. B. C. Nitze, Baltimore, Md., F. L. Ransome, Berkeley, Cal., Charles Schuchert, Washington, D. C., and Joseph A. Taff, Washington, D. C. Philadelphia is to be the place of the next meeting, during the Christmas holidays.

Previous to this session, an excursion of a week's duration was taken, beginning at Pittsfield, Mass., and passing Hinsdale, Great Barrington, Mt. Washington, Mt. Race, Bear Mountain, Salisbury, Canaan, Middlefield, Chester, Greenfield, Turner's Falls and Bernardston, all in Massachusetts, to South Vernon, Vt., under the leadership of Profs. B. K. Emerson and W. H. Hobbs. Sixteen fellows and invited friends participated in this most enjoyable observation and study of the metamorphic rocks and Triassic area of western Massachusetts and the Connecticut valley, namely, George H. Barton, Boston, Mass., Miss Florence Bascom, Bryn Mawr, Pa., A. C. Boyden, Bridgewater, Mass., W. B.

Clark, Baltimore, Md., Miss Charlotte F. Emerson, Amherst, Mass., O. C. Farrington, Chicago, Ill., C. H. Hitchcock, Hanover, N. H., F. J. H. Merrill, Albany, N. Y., William Orr, Jr., Springfield, Mass., Chas. Palache, Berkeley, Cal., Joseph H. Perry, Worcester, Mass., William North Rice, Middleton, Conn., Miss Smith, Framingham, Mass., C. R. Van Hise, Madison, Wis., Lewis G. Westgate, Evanston, Ill., and Albert A. Wright, Oberlin, Ohio. The party traveled, as convenience dictated, by railroad, by livery carriages, and much afoot, to the localities where the contracts of different rock formations, faults and dynamic metamorphism could be best seen. The rich and varying development of secondary minerals along the lines of contact and disturbance was beautifully illustrated. The weather was perfect the whole time, with cool nights and mostly mild and clear days, having neither rain nor excessive heat. Admiration of the visiting geologists was freely expressed for the large area of complex crystalline rocks which during the past several years Prof. Emerson has mapped in detail for the U. S. Geological Survey, going afoot over all parts of a tract of about 5,000 square miles.—*The American Geologist.*



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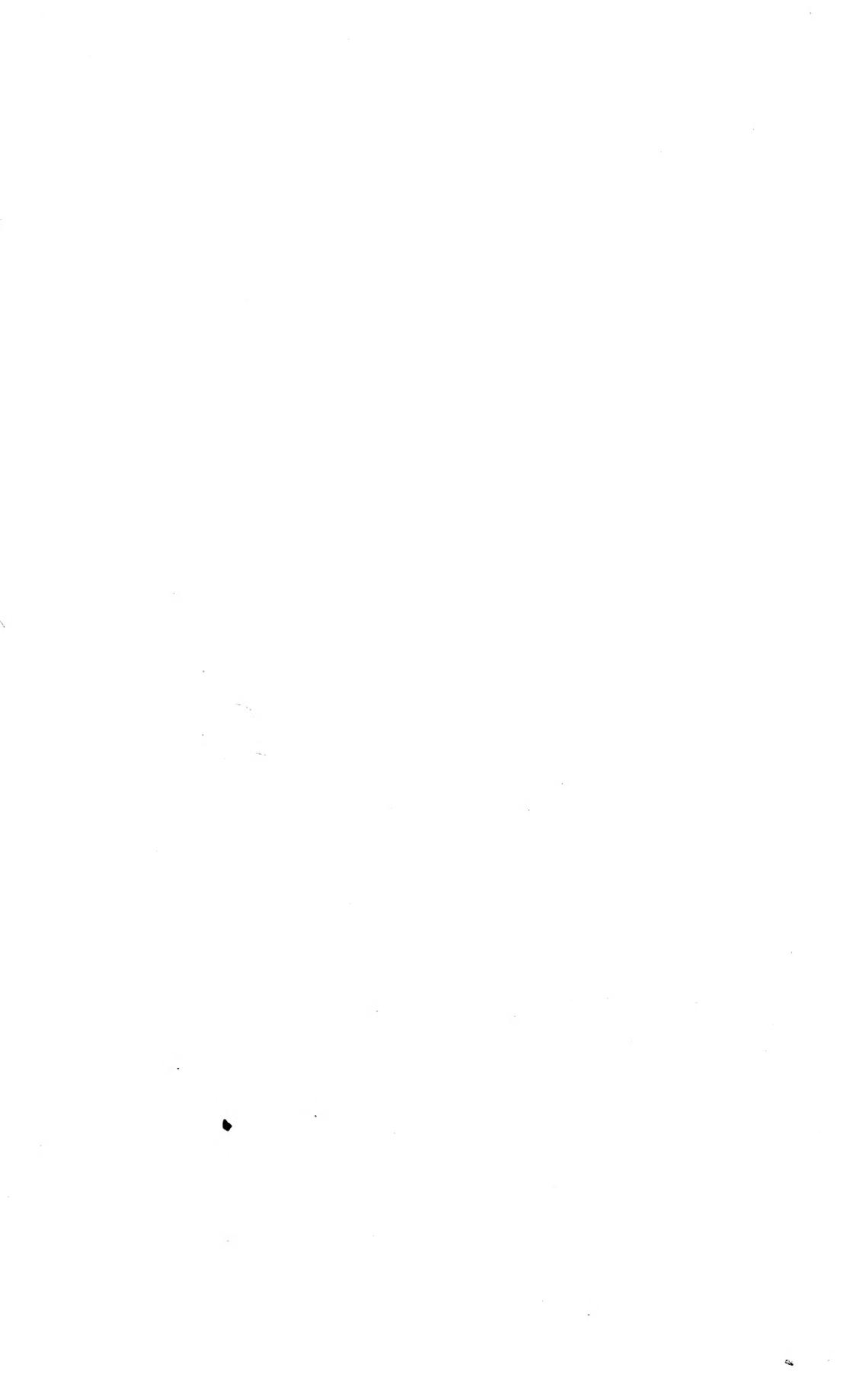
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